

FEDERAL SYSTEMS INTEGRATION MARKET, 1985-1990

INPUT



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**FEDERAL SYSTEMS  
INTEGRATION MARKET, 1985-1990**

**JUNE 1984**



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FEDERAL SYSTEMS INTEGRATION MARKET,  
1985-1990

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## I INTRODUCTION





## I INTRODUCTION

- This report on systems integration was prepared as part of the Federal Information Systems and Services Program (FISSP).
- A majority of FISSP clients expressed a high degree of interest in this topic on the basis of increasing federal government market demand, both to replace obsolete current systems and add new in-house data processing resources.
- Research for this report is based on an analysis of the INPUT Procurement Analysis Report, previous INPUT research conducted during 1981 through 1983, and discussions with the initial FISSP vendor clients.

### A. SCOPE

- This report covers those integrated systems and systems integration programs listed in the OMB/GSA/NBS Five-Year Plan for GFY 1984 to 1988, related federal agency long-range ADP plans, and federal agency GFY 1984 and 1985 Information Technology Budgets.
- The agencies selected for interview were identified in one or more of the above plans as proposing to acquire integrated systems.

- The vendors selected for interview were identified as contractors of record for ongoing integration programs, or listed as vendors for integrated systems or system integration services in INPUT's Company Analysis and Monitoring Program data base for 1983.
- The period of interest is GFY 1984 to 1990. Although GFY 1984 will be at its midpoint at the time of publication of this report, a number of program initiations were delayed by the late passage of the 1984 Defense Appropriations Act, and others were slipped to GFY 1985 by funding restrictions.

## **B. METHODOLOGY**

- The OMB/GSA/NBS Five-Year Plan analysis for the INPUT Procurement Analysis Report was reviewed for programs initiated during the period of interest.
- The available agency Long-Range ADP Plans for GFY 1984-1988 and GFY 1985-1989 were researched for major system replacements, conversion from out-of-agency data processing services, and new system initiations (new starts).
- Questionnaires were developed for interview of both federal agency officials and systems vendor executives.
  - Federal agency officials selected for interview included:
    - Information Resource Managers.
    - Contracting Officers (buyers).
    - Program Managers (users).
    - Data Center Managers (users).



- Vendor executives selected for interview included:
  - . Company executives.
  - . Marketing executives.
  - . Operations executives.
- Questionnaires were developed from the initial client discussions and reviewed with them to include areas of interest. A copy of the agency and vendor questionnaires are included in Appendix E.
  - The agency questionnaire was designed to acquire information about plans for replacement and new systems and applications.
  - The vendor questionnaire was designed to acquire industry status and future federal market plans.
  - Both include similar questions about contracting policy and preference, selection criteria, and vendor performance characteristics for comparison.

### C. REPORT ORGANIZATION

- The report has been organized into five sections:
  - Executive Summary.
  - Market Analysis and Forecast.
  - Agency Requirements.

- System Integration Vendors.
- Systems Integration Opportunities.
- Five appendices are provided to aid in report use:
  - Interview Profile.
  - Definitions.
  - Glossary of Federal Terminology.
  - Related INPUT Reports.
  - Questionnaires.

## II EXECUTIVE SUMMARY





## II EXECUTIVE SUMMARY

### A. OVERVIEW

- The federal systems integration market prospects during the decade of the 1980s have risen considerably with the new government focus on upgrading its information resources.
  - Project demand for systems and services is shifting toward improved in-house capability.
  - Federal workforce is heavily committed to maintaining existing systems and inadequately staffed to add new systems.
  - Continuing increase in the ratio of software to hardware costs lends emphasis to utilization of commercially developed efficient ADP systems.
- INPUT believes that the federal market demand for systems integration will sustain a 19% average annual growth rate in the 1985-1990 forecast period.
  - The growth rate in the earlier years will be higher but will abate as the initial system replacement need is met.

- Federal government experimentation with major system acquisition procedures under OMB A-109 appears to be restricted to only those acquisitions with life cycle costs exceeding \$0.5 billion.
- Newer acquisition procedures under the FAR and FIRMR should simplify the procurement of smaller systems.

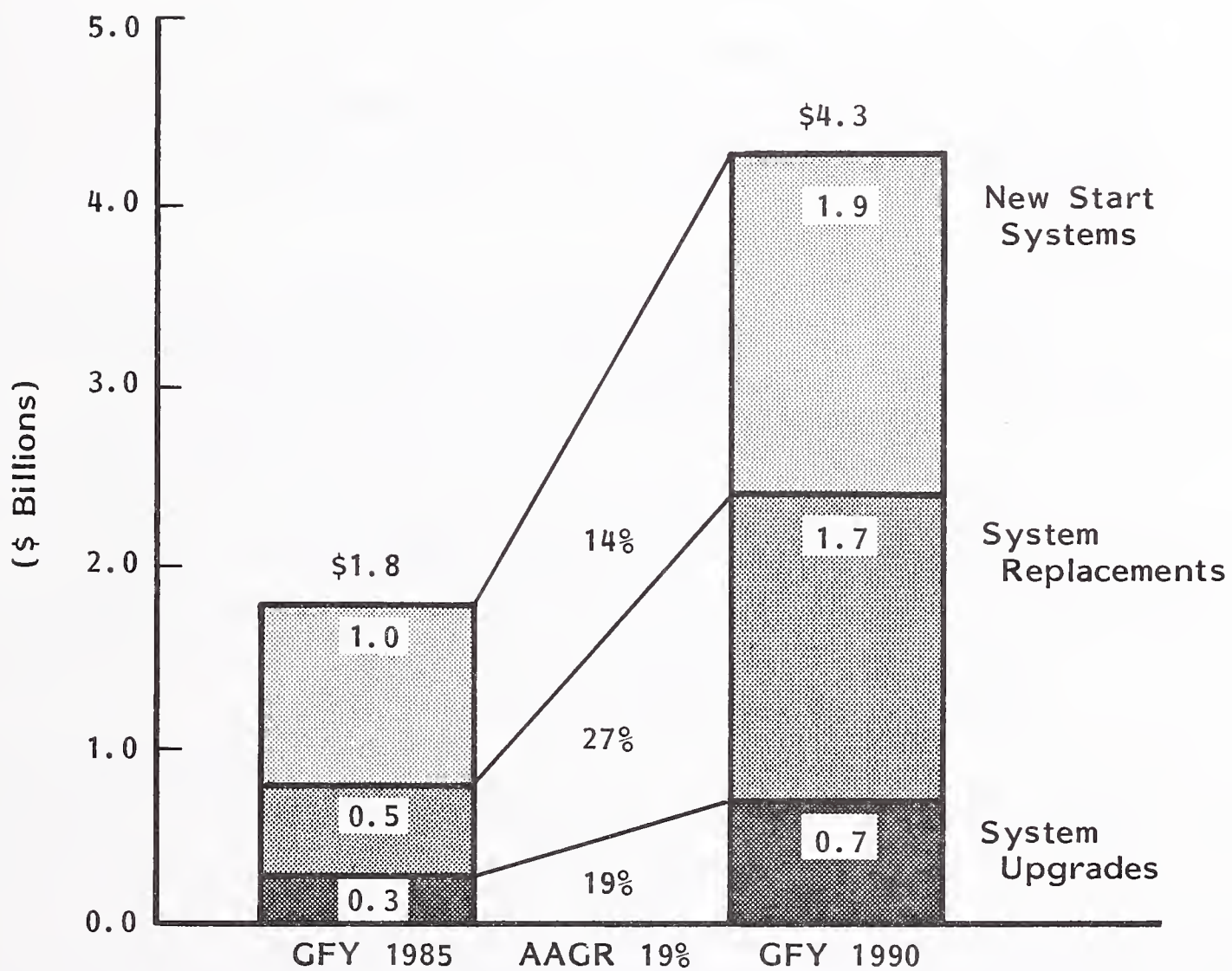
## **B. MARKET FORECAST**

- INPUT estimates that the federal government systems integration market will increase from \$1.8 billion in 1985 to \$4.3 billion by 1990, at an average annual growth rate of 19%, as shown in Exhibit II-1.
- System upgrades will increase from \$300 million in 1985 to \$700 million in 1990, at an AAGR of 19%.
  - These figures include standalone graphics, CAD/CAM, maintenance tracking, financial planning, and project control applications.
- Systems integration of replacement systems is expected to increase from \$500 million in 1985 to \$1.7 billion by 1990, at an AAGR of 27%.
- New Start systems integration programs are projected to increase from \$1.0 billion in 1985 to \$1.9 billion by 1990, an AAGR of 14%.
  - The growth rate is influenced by the long implementation periods of systems valued at more than \$1 billion.
  - Emphasis on replacing obsolete and obsolescent systems is expected to delay full implementation of newer type systems.



# EXHIBIT II-1

## FEDERAL SYSTEMS INTEGRATION MARKET FORECAST 1985-1990



Note: Dollars are rounded to nearest \$100 million.

Sources: Five Year Plan (OMB/GSA) 1983  
Ten Year Electronics Forecast (EIA) 1983  
Federal Agency Long Range ADP Plans

- Forecast excludes budgeting estimates for post-installation facilities management, maintenance beyond warranty periods, and subsequent custom software development.

### C. COMPETITIVE FORCES

- More recent systems acquisition awards appear to favor separate contracting for systems design/engineering/integration, hardware systems, hardware peripherals, and software conversion, except for VIABLE and PHASE IV programs.
  - Systems integration specialists in systems houses, aerospace firms, and the FCRC nonprofits appear as the strongest contenders.
  - Subcontractor specialists in software, fabrication, training, and special applications are playing important support roles.
  - Systems houses are watchful of the increasing threat of AT&T deregulation and the AT&T-IBM competition.
- Early teaming discussions and long-term relationships with suppliers are becoming key proposal evaluation factors for agency source selection boards.
- Interest in the size of the systems acquisition budget of the federal government is growing among larger companies with proven production capabilities.
- Foreign competition could become a serious threat to U.S. industry unless substantial cost-effective benefits accrue to non-sensitive systems acquisition.

#### D. MARKET OPPORTUNITIES

- Many, but not all, of the federal systems integration opportunities have been identified in Section VI from available documentation and interviews.
  - Defense plans to acquire new systems to replace planned lease systems under the Congressional "Buy-Not Lease" mandate are not yet available.
  - A number of civil agency system replacement programs now planned for in-house integration may go to contract if staffing budgets are cut.
- Professional services vendors with experience in the federal government sector should initiate marketing strategy development to penetrate both the systems integration vendor and federal agency segments to improve awareness of special skills and capabilities.
- Software product vendors need to substantially improve their awareness of federal software requirements and increase the visibility of their products.

#### E. RECOMMENDATIONS

- Hardware and software systems houses need to improve pre-bid and proposal strategic planning to increase the prospect of award. The agency and vendor interviews indicate some differences in the significance of contractor selection criteria, as shown in Exhibit II-2.
  - The agencies' ranking was influenced by those with prior systems integration experience.



EXHIBIT II-2

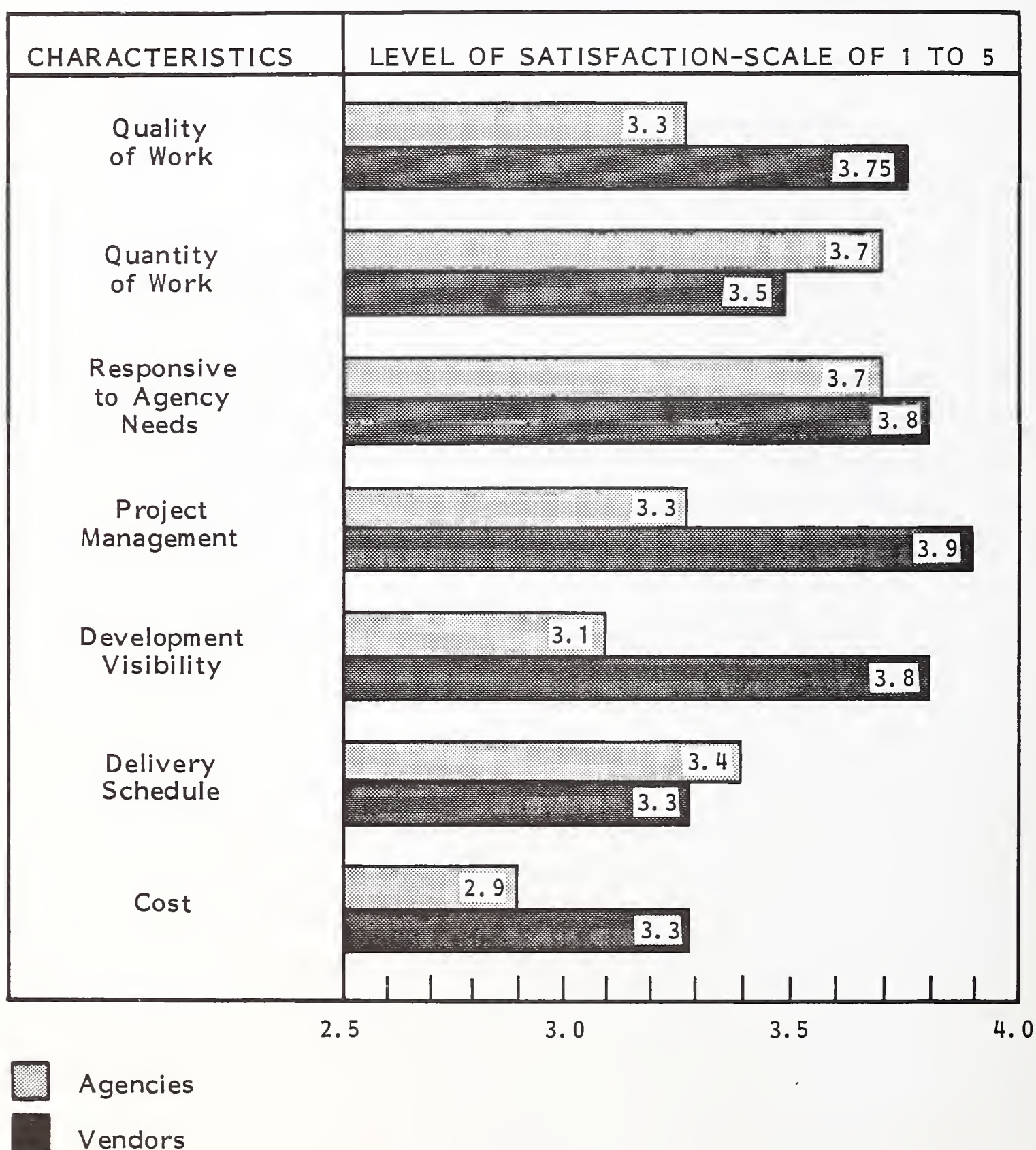
SELECTION CRITERIA SIGNIFICANCE FOR  
SYSTEMS INTEGRATION CONTRACTS  
AGENCY VERSUS VENDOR VIEWS

RANK	AGENCIES	VENDORS
1	Technical Solution	Technical Solution
2	Life Cycle Cost	Risk Containment
3	Contract Type	Life Cycle Cost
4	Risk Containment	Initial Cost
5	Initial Cost	Contract Type
6	Project Management	Project Management

- Most agencies and experienced systems integration vendors prefer fixed price contracts with a mix of CPFF for design/development and FP for implementation as a second choice. More stringent and effective program management practices appear essential to both contract award and profitable completion.
- Agencies are far less satisfied with the quality of work, vendor project management, and visibility of system development than vendor management perceives or is led to believe by their project leaders, as indicated in Exhibit II-3.
  - Agencies lack enough qualified system planners and program managers for tight control.
  - Agency executives would prefer that there be greater risk sharing and that responsibility for success is placed on the contractors.
- Systems integration vendors need to invest more effort in understanding the agency's mission and information resource requirements to find an appropriate system solution, rather than modifying the requirements to meet an available solution. Agency policy officials voiced this concern repeatedly.

# EXHIBIT II-3

## AGENCY LEVEL OF SATISFACTION WITH SYSTEMS INTEGRATION VENDORS – AGENCY VERSUS VENDOR VIEWPOINTS



### III MARKET ANALYSIS AND FORECAST





### III MARKET ANALYSIS AND FORECAST

#### A. OVERVIEW

- During the two most recent administrations, presidential task forces have investigated the problems and technological status of the federal government's information processing resources.
  - The government has not taken advantage of the technological advances of the private sector.
  - A substantial amount of the ADP inventory is obsolete or rapidly becoming obsolete.
  - Federal executives have not managed ADP resources effectively.
  - Major initiatives are urgently needed to bring federal information management to the level needed for regulation, taxes, security, and services to the public.
- INPUT believes that the demand for integrated systems of the federal government will be sustained at least through 1990 and then level off, unless impacted earlier by one or more critical national economic issues.

- Presidential election years always imply budgeting for political, not practical, reasons.
  - Major ADP systems already approved are likely to continue in preference to unapproved programs.
  - Defense cuts should impact embedded computer acquisition rates more than general purpose systems.
  - The computer system portion of defense electronic expenditures has steadily increased since 1980.
  - Major civil systems affect service to the public and have greater political appeal than research programs.
- Systems acquisitions of the mid-1980s are addressing needed improvements in management, administration, human resources, and logistics functions, which have not been provided with newer data processing resources in more than a decade.
- Congress urgently needs more precise and timely data for the legislative process.
  - Administration decisions often lack complete data on domestic issues and regulatory affairs.
  - Agency executives need trend analysis and status reports that accurately portray funding, staffing, and performance progress against mission objectives.
  - The public is increasingly frustrated by delays and errors in processing payments and satisfying information requests.

- Key government agencies, OMB, GSA, GAO, and NBS have initiated a progression of acquisition reforms that will hopefully accelerate the acquisition and improve the management of information resources (ADP and telecommunications) while fostering wider competition.
- Emphasis on OMB A-109/DD 5000./Major System Acquisition policy is lessening.
  - Major agencies employ the system acquisition methodology effectively.
  - Agencies are learning to articulate functional needs to industry earlier.
  - Proliferation of personal computers is changing the policy of centralized data processing beneficially.
- FAR and FIRMR should improve relations between managers, users, contracting, and service providers.

## **B. MARKET FORECAST**

- The federal systems integration market combines several of the commercially defined systems and services modes, as noted in Appendix C of this report:
  - Integrated (turnkey) systems for specialized industry and cross-industry applications:
    - CAD/CAM systems.
    - Training and simulation systems.



- Financial and budget systems.
  - Maintenance and job tracking.
  - Energy management systems.
  - Graphics and mapping systems.
  - Cargo and transportation scheduling.
- Hardware systems, including CPUs, memory and entry peripherals, and system operating software.
- Professional services, including:
  - System design.
  - System engineering and integration.
  - Site preparation and installation.
  - Applications software (new).
  - Applications code conversion.
  - Independent verification and verification of performance.
- Software products for operating system software and standard or modifiable applications for:
  - Mainframes.

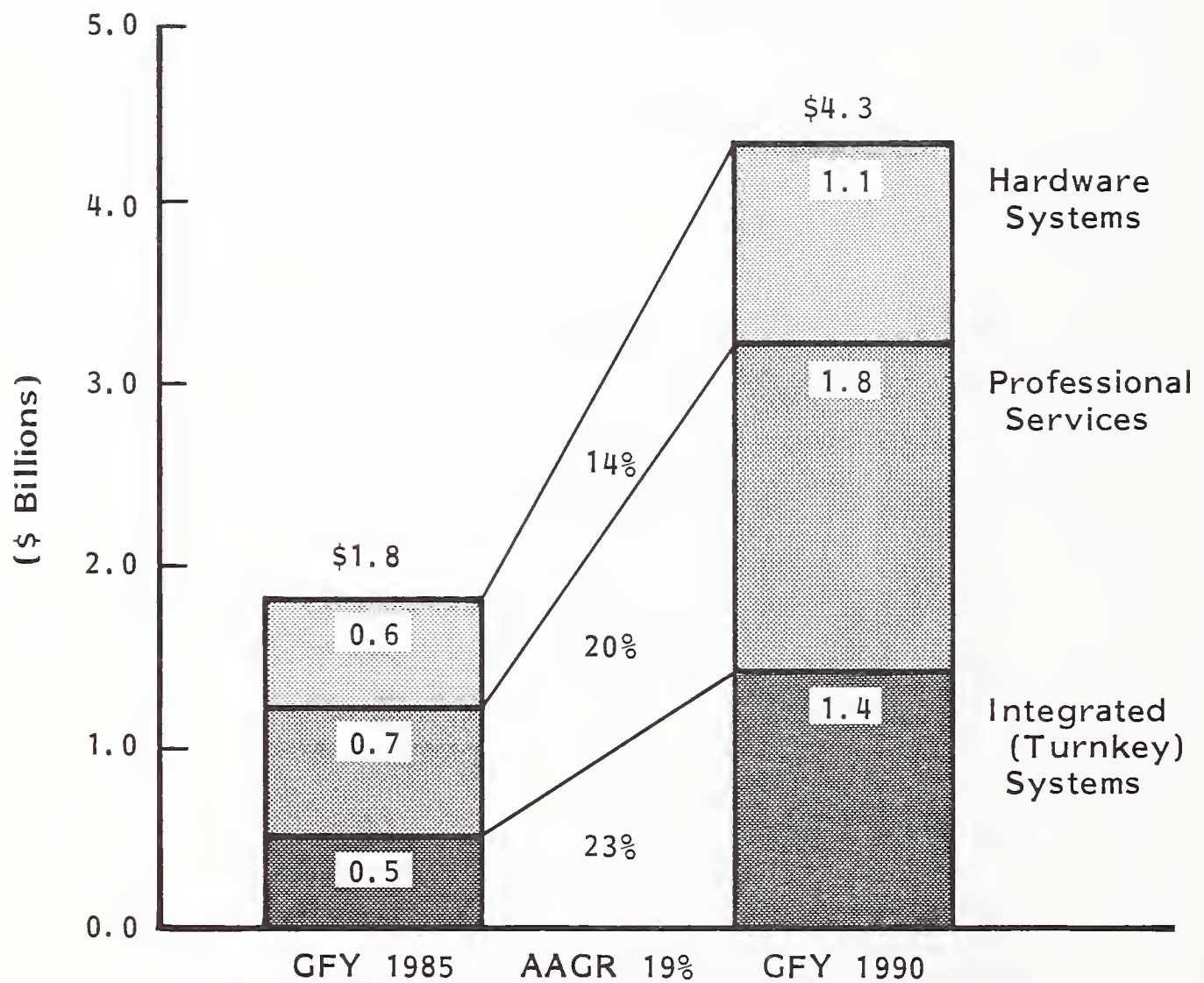
- Nodal or concentrator minicomputers.
- Personal computers and specialized workstations.
- Data telecommunications services:
  - Communications controllers.
  - VANs and LANs.
  - Dedicated media systems.

## I. MODE FORECAST

- The service mode systems integration component forecast is illustrated in Exhibit III-1. The estimates were developed through a variety of sources, including agency budget requests and funding forecasts that are subject to Administration and Congressional budget approval cycles.
  - The first service mode component is specialized integrated (turnkey) systems, forecast to increase from \$500 million in FY 1985 to \$1.4 billion in FY 1990, with an AAGR of 23%.
  - The second component service mode is professional services, which provides the system design, engineering and integration, IV & V, code conversion, and custom applications software development. The SI portion of this mode is forecast to increase from \$0.7 billion in FY 1985 to \$1.8 billion in FY 1990, at an AAGR of 20%.
  - The third component is hardware and hardware systems, estimated to grow from \$600 million in FY 1985 to \$1.1 billion in FY 1990, at an AAGR of 14%.

# EXHIBIT III-1

## FEDERAL SYSTEMS INTEGRATION MARKET SERVICES AND SYSTEMS MODES GFY 1985-1990



Note: Dollars Rounded to Nearest \$100 Million.

Sources: Five Year Plan (OMB/GSA) 1983  
Federal Agency Long Range IR Plans  
Ten Year Electronics Forecast (EIA) 1983  
U.S. Information Industry (INPUT) 1983

## 2. AGENCY FORECAST

- The agency forecasts are based on a combination of Long-Range ADP Plans, projection of previous Information Technology Budgets, programs described in the agency OMB-A-11 Section 43 A & B proposed programs, and interviews with policy officials and ADP Center managers. The forecast is shown in Exhibit III-2.
- No estimate is available for the cost or funding of planned conversion of applications from other information processing resources to new in-house systems.
  - Current resources included RCS, P-FM, and government data centers outside the agency.
  - Size of monthly costs of running the application were not provided.
- Agency shares of SI programs are a combination of part of their ADP systems upgrade and replacement budgets and most of their new system acquisition budgets.
  - The exceptions are the FAA portion of transportation for the ATC Replacement and new Air Force and NASA systems to support the military and civilian space initiatives.
  - Most of Energy's new system budget will not be expanded on SI programs, along with about half of Commerce, both of whom use current on-site contractors for integration.



EXHIBIT III-2

FEDERAL SYSTEMS INTEGRATION MARKET

AGENCY FORECAST

GFY 1985-1990

FEDERAL AGENCY	PERCENT OF MARKET FORECAST			
	UPGRADE	REPLACE	NEW START	TOTAL
Transportation	13%	36%	1%	17%
Air Force	29	10	19	16
Defense Agencies	9	16	11	13
NASA	7	4	14	9
Army	4	3	15	7
Navy	7	4	9	7
Justice	5	3	6	4
Treasury	7	4	3	4
HHS	5	4	4	4
Energy	6	4	2	3
GSA	3	2	4	3
Commerce	0	0	4	2
Vet Administration	2	}	2	}
EPA	0		1	
Agriculture	0		1	
Interior	0		}	
Other Civil	3			
Total	100%	100%	100%	100%

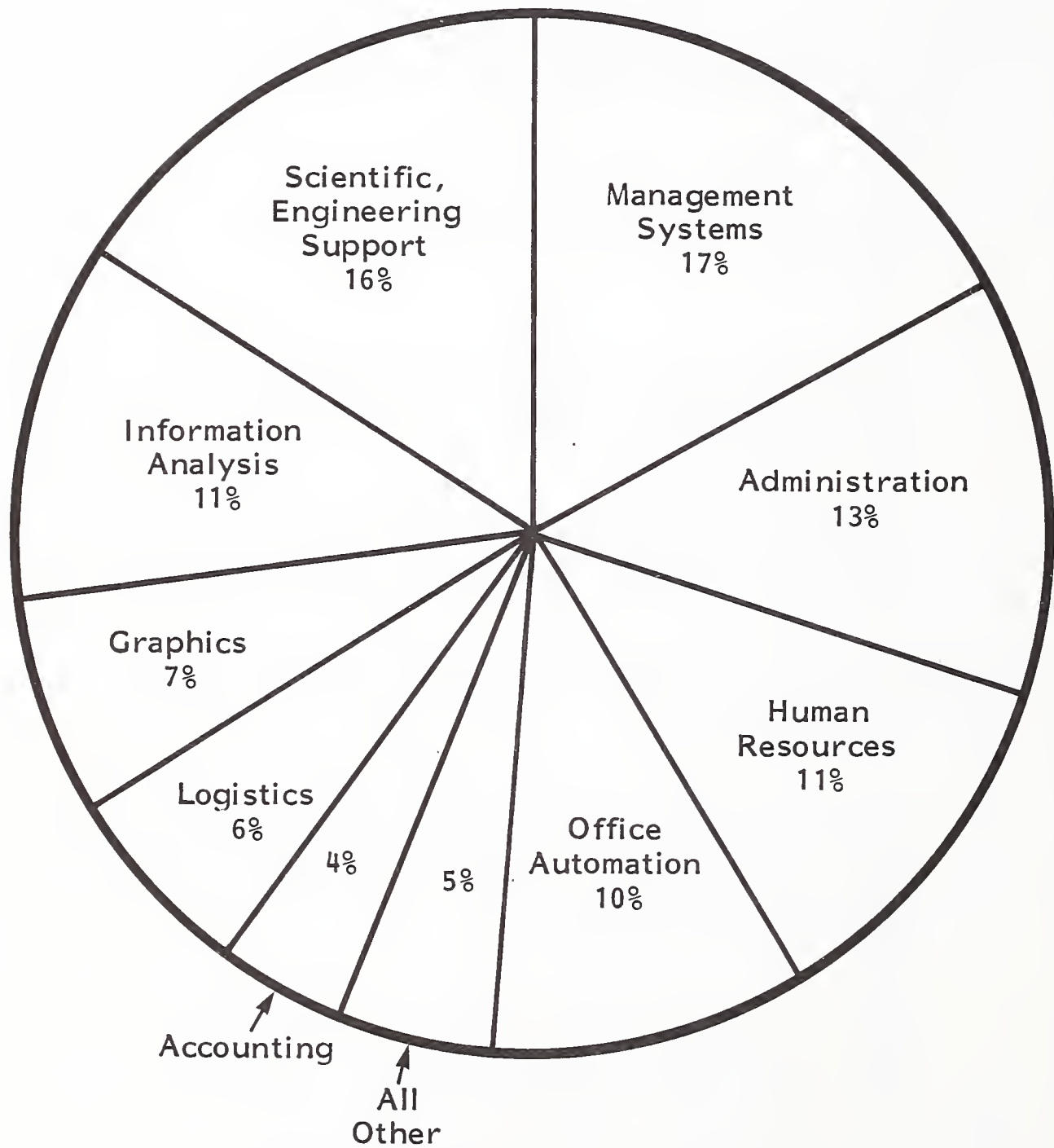
Note: All percentages are rounded to the nearest one percent.

Sources: Five Year Plan (OMB/GSA)  
Federal Agency Long Range ADP Plans  
Ten Year Electronics Forecast (EIA) 1983

### 3. APPLICATIONS FORECAST

- Information resource applications are identified by a variety of titles between Defense and Civil agencies, and between Civil agencies with different governmental functions. Similar Defense applications are coded or given acronyms by each of the Military Departments and Defense Agencies in the common commercial applications of personnel, payroll, distribution, and accounting.
  - Applications have been converted to standard terms defined in Appendix B.
  - Variations on applications for particular functions have been grouped with the baseline application form.
  - The appropriate distribution of operating and applications software in Exhibit III-3 includes information provided in Chapter IV.
- The applications forecast is not intended to be an accurate prediction, but merely representative.
  - A number of SI programs note that additional applications will be added later in the program by either contract or in-house staff without specifying the application.
  - In SI replacement programs, not all of the resident applications that will be converted to the new machine are specified.
  - The implied trend of the identified operating systems and applications are discussed in greater detail in Chapter IV.
  - Applications planned for conversion from non-agency processing centers (RCS, COCO, government data centers, etc.) were also not

EXHIBIT III-3  
FEDERAL SYSTEMS INTEGRATION MARKET  
APPLICATIONS FORECAST  
GFY 1985-1990



adequately defined by type and number in the representative interviews.

## C. COMPETITION

- Competitors for systems integration opportunities vary to some degree with the projected value, application, sponsoring agency and end user. Additional discussion on SI vendors is provided in Chapter V.
- Potential and identified competitors for each category of systems acquisition are identified by service category. Some vendors compete in several categories because they offer products and/or services over a number of commercial and government market sectors.
  - Specialized integrated systems.
  - Mini/microcomputer-based systems.
  - Midi/mini/microcomputer networked distributed data systems.
  - Large CPU-based systems with or without distribution networks.
  - Supercomputer systems are frequently the host for several mainframes that may support distributed minicomputer and microcomputer terminals.

### I. SPECIALIZED INTEGRATED SYSTEMS

- The relative federal revenue standing of these vendors was not available for this report. The identified vendors are listed alphabetically in Exhibit III-4.



## EXHIBIT III-4

### SPECIALIZED INTEGRATED SYSTEMS VENDORS

C <sup>3</sup> Inc.*	M/A COM Sigma Data
CDC*	PRC
CSC	Raytheon
EDS	Robertshaw
GE/CALMA*	ROLM
Gould	Sanders
Honeywell	Sperry
HRB-Singer	Tektronix
IBM	Texas Instruments
Intergraph*	TRIAD*
Johnson	TRW

\*Note: Identified in INPUT's U.S. Information Services Report, 1983-1988 as one of the 15 largest Integrated Systems Vendors by Noncaptive U.S. Revenue.

- The list includes parent firms of specialized divisions.
- A number appear in INPUT's 1983 industry report.
- Some are specialists in Defense systems.

## 2. PROFESSIONAL SERVICE VENDORS

- The larger professional service vendors are key competitors for both prime contractor and systems engineer/integrator in the SI market.
  - List A in Exhibit III-5 includes those identified in INPUT's U.S. Information Services Markets (1983).
  - List B in Exhibit III-5 includes those identified in Exhibit V-I of Section V of this report.
  - List C in Exhibit III-5 is the remainder of the professional services SI vendors included in Chapter III of the Federal Procurement Analysis Report - INPUT 1984.
- Smaller professional service vendors who are either seeking a role in SI or are involved through separate contracts with the contracting agency include:
  - Big Eight accounting firms, especially for financial, budget, and accounting applications:
    - . Arthur Anderson.
    - . Coopers and Lybrand.
    - . Deloitte, Haskins and Sells.

# EXHIBIT III-5

## PROFESSIONAL SERVICES SYSTEMS INTEGRATION VENDORS

(A)

RANK 1982	COMPANY
1	Computer Sciences Corporation
2	Electronic Data Systems Corporation
3	Burroughs Corporation
4	International Business Machines Corporation
8	Planning Research Corporation
10	CACI Inc.
11	Control Data Corporation
12	General Electric Company
13	McDonnell Douglas Automation Company
14	Grumman Data Systems
15	Syscon

Source: U.S. Information Services Markets (INPUT) 1983

(B)

RANK 1983	COMPANY
1	TRW
2	Ford Aerospace Corporation
4	Martin Marietta
6	Boeing Computer Services Inc.
7	Science Applications, Inc.

Source: Federal Systems Integration Market (INPUT) 1984

(C)

BDM International
Calculon
EG&G
E Systems (Melpar)
Gould
Harris Systems
Informatics
Intermetrics Inc.
Lockheed
Logicon
Mitre
RCA
Sperry
Systems and Applied Sciences Corporation
Vion

Source: Federal Procurement Analysis Report (INPUT) 1984

- . Ernst and Whinney.
- . Peat, Marwick and Mitchell.
- . Arthur Young.
- Management services firms are also candidates:
  - . American Management Systems.
  - . Bolt, Beranek and Newman.
  - . Booz, Allen, Hamilton.

### 3. MAINFRAME VENDORS

- The major minicomputer, medium, and large CPU vendors are also contenders for SI programs, because most offer upward-compatible CPUs for systems being replaced and newer systems with enhanced capabilities.
  - Burroughs.
  - CDC.
  - Cray.
  - Data General.
  - DEC.
  - Four Phase.
  - Gould (SEL).



- Harris.
- Hewlett-Packard.
- Honeywell.
- IBM.
- NCR.
- Prime.
- Rolm.
- Sperry.
- Tandem.
- VION.

#### 4. FOREIGN COMPETITION

- Improving trade relations with the Far East and the NATO countries introduces the prospect of hardware system competition for non-sensitive administrative, management, and office automation projects.
  - Typical vendors include Hitachi, Fujitsu, ICL, Siemens, Phillips, and others.

#### D. SYSTEMS INTEGRATION OPPORTUNITIES

- A list of major SI opportunities is provided in Section VI.
  - Programs awarded in FY 1982, FY 1983, and early FY 1984 are listed because some have multiple phases with contracts yet to be awarded.
    - Every SI contract has some prospect of being recompeted.
    - Some smaller SI programs have been defaulted and may be recompeted.
  - Programs listed in FY 1984 include a number in the solicitation and proposal stages for which awards have not been made.
  - Some programs listed for FY 1985 already have feasibility, preliminary design, and requirements underway, but the prime contract or SE&I contract is not awarded.
  - The program lists for FY 1987 and FY 1988 are small because a number of programs for those years have not been approved by the Agency.

#### E. FEDERAL POLICY AND REGULATIONS

- Federal ADP and telecommunications systems have been procured and managed for more than two decades by the FPRs, FPMRs, and ASPRs.
  - ADPE and services procedures were modified by the 1966 Brooks Bill and its subsequent amendments.

- The Office of Federal Procurement Policy was created in 1976 to develop a single procurement code for the federal government.
  - . It created OMB Circular A-109 for major systems acquisition, including ADP systems as an interim measure.
  - . The final code, the Federal Acquisition Regulations, became effective April 1984.
  - . Changes in the FAR are recommended by two agency representative groups:
    - Defense Acquisition Regulatory Council (includes NASA).
    - Civilian Agency Acquisition Council (all departments).
- The Paperwork Reduction Act was initiated for that purpose but includes a number of provisions concerning information resource management:
  - . Created post of Information Resources Manager in each department and major agency.
  - . Placed all but sensitive and mission-essential defense ADP under a new "mini-Brooks Bill."
  - . Provided a separate approval procedure for national security and defense mission ADP.
  - . Authorized annual preparation and publication of a Federal Agency Five-Year Plan for major ADP/Telecomm Acquisition by OMB and GSA.

- Under the authority of the Federal Administration Act and the Paperwork Reduction Act, GSA has prepared a new regulation for information resources. Now in final draft review, the Federal Information Resource Management Regulation will supercede the FAR and FPMR in IRM areas:
  - It combines in one regulation the acquisition, management, and use of all ADP and telecommunications not covered by separate statutes for reasons of sensitivity.
  - It is initially based on the related sections of the FAR and will include related provisions of DARC and CAAC-originated FAR amendments.
  - The FIRMR is expected to streamline the TR acquisition process; how effective it will be depends on several factors:
    - When it becomes effective (FAR took almost three years).
    - How long it takes to educate contract officers and procurement specialists.
    - How soon after passage it is amended to satisfy individual agency "special requirements."
- Systems integration acquisition will be conducted under the appropriate sections of the FAR until FIRMR becomes effective.
  - Many systems and services vendors were unfamiliar with the Federal Property Management Regulations in effect for more than 26 years.
  - All but the largest vendors have not reviewed the FARs, although available through the Federal Register for six months.



- A working knowledge of the sections of the FARs that will transfer to the FIRMR appears to be essential to success in the federal SI market as either a prime contractor or first tier subcontractor.

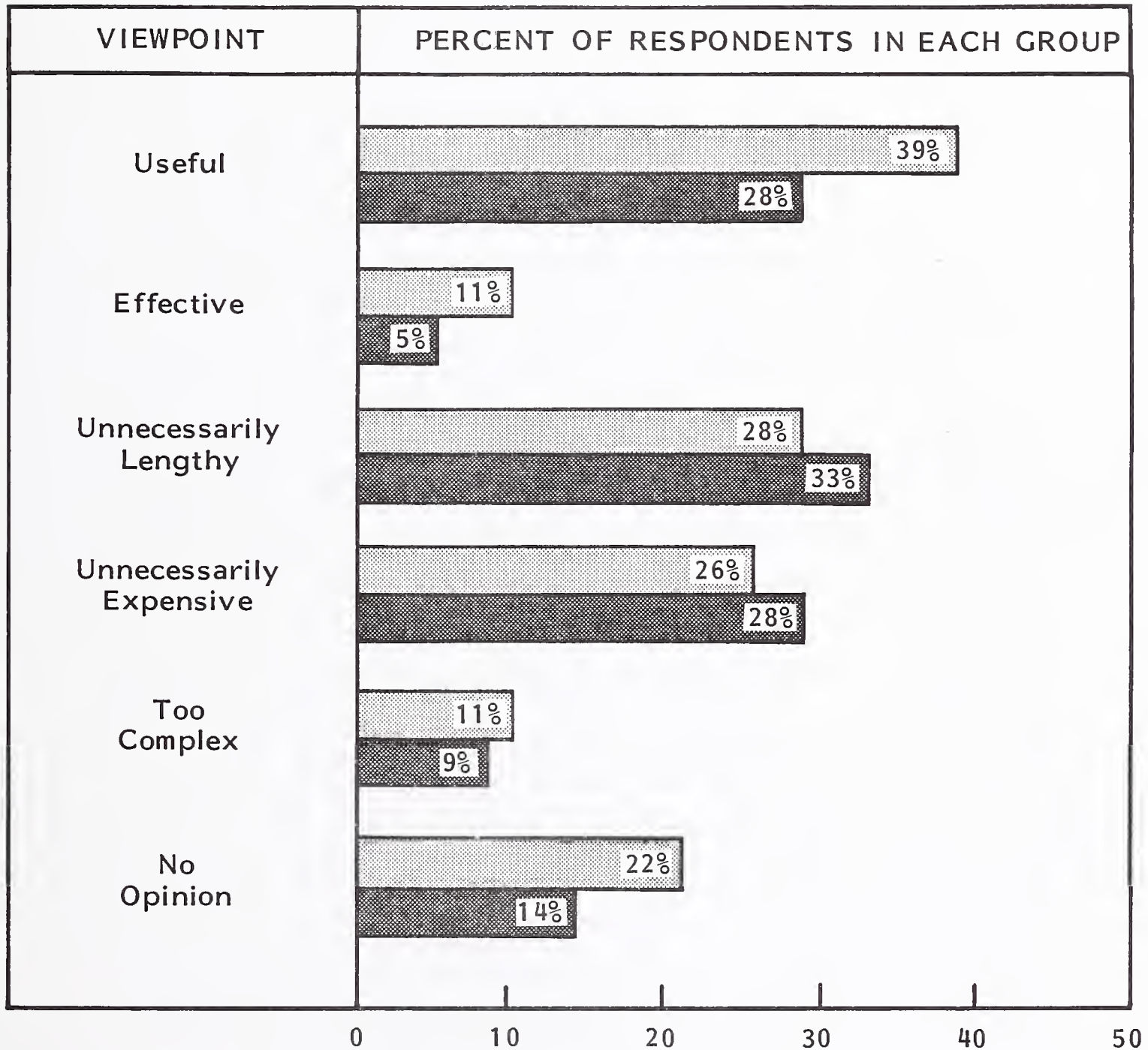
## F. UNCERTAINTIES AND ISSUES



- OMB Circular A-109 and its Defense Department counterpart, DD-5000./ are expected to continue in force for major ADP/telecommunications systems acquisition for all agencies. The principal effect of the new FIRMR may be to raise the effective thresholds for application to each agency.
  - The reactions of agencies and vendors to the policy during the interviews are seen in Exhibit III-6.
  - Most IRMs believe A-109 will be imposed on all systems large enough to attract Congressional attention.
- The FY 1984 Defense Appropriations Act mandated the competitive replacement of most DoD-based ADP equipment.
  - The amortization plan submitted in April 1984 is not yet public.
  - The estimate of the leased programs in the 1983 Five-Year Plan now in doubt is more than \$2.1 billion.
  - The delay in replacement timetables enhances the prospect of vendor-furnished systems integration.
- Future year funding of current acquisition programs and approval of funding for the next budget year are always in doubt in the federal government market.

# EXHIBIT III-6

OMB-A109/DD-5000.1/5000.2

## ACQUISITION POLICY – AGENCY VERSUS VENDOR VIEWPOINTS



 Agencies  
 Vendors

- Authorization of an agency budget and the requested information resources by the agency oversight committee does not assure the agency or vendors that funds will be provided.
  - Appropriation Acts for the agencies approve the TOA (Total Obligational Authority) for certain large systems, but not the fiscal year or years in which the funds will be expended (called outlays).
  - The general election years see the largest budget cuts, which affects the fiscal years beginning October 1, 1984 and 1988.
  - Sensitivity, both economically and politically, to the growing national deficit could negatively impact a number of SI acquisitions in the "less than critical" defense and civil technology sectors.
- The forecast data for FY 1987 to 1990 are based on estimates of government and industry panels, Congressional Budget Office forecasts, and agency policy official opinions. INPUT has no firmer basis for its forecast, which is subject substantially in the federal marketplace to the uncertainties described above.

## **IV AGENCY REQUIREMENTS**





## IV AGENCY REQUIREMENTS

### A. AGENCY SHARE

- The forecasted distribution of SI programs by agencies is indicated in Exhibit III-2 in the preceding chapter.
- System replacement budgetary estimates of the OMB Five-Year Plan were divided into up into three categories in the agencies:
  - Replacement of older leased hardware systems by newly leased hardware systems.
    - Army and Energy are the agencies with predominantly leased ADPE.
      - Army budgeted for contract or services to perform software upgrade.
      - Energy usually specified use of in-house staff.
    - The Air Force and Navy lease much less ADPE, preferring RCS contracts to leases.

- Replacement of older government-owned hardware systems by new hardware systems.
  - . The Air Force, NASA, and Commerce planned nearly half of their budgets in this subcategory.
    - The Air Force planned to use in-house staffs for about half of the conversions, and contractors for the remainder.
    - NASA planned to use staffs of O&M or FM contractors.
    - Agencies in Commerce planned most conversions for contractor assistance.
- Replacement of the entire system of hardware and software is planned by Defense Agencies and the remainder of the civil agencies through SI contracts.
- New system acquisition budgeting estimates of both the OMB Five-Year Plan and agency long-range plans were also unevenly divided into up to three categories by the agencies.
  - GSA new system budget is large, but is used for other agencies. It includes:
    - . Purchase for and lease back to agencies requiring new systems but lacking adequate acquisition funds in the earlier years.
    - . Discounted volume purchases to stockpile for later agency temporary use or emergency need to expand processing resources.

- NASA, Energy, and Commerce new systems are split between design and implementation by FM or facility operations contractors already under contract and turnkey system acquisition for new sites or new functions.
- Air Force, Navy, and the remainder of the civil agencies acquire new systems as either turnkey under a prime contractor or as systems integration programs with separate SE&I, hardware system, code conversion, and custom software development contracts.
- The replacement acquisitions, including systems integration acquisitions, are almost evenly divided between defense and civil agencies in FY 1985 and FY 1986, but shift toward defense, especially the Defense Agencies in FY 1987 and FY 1988.
  - The system replacement program was forecasted to continue the decline begun in FY 1988 through FY 1990.
  - The civil agency replacement budgets for FY 1987 and out beyond FY 1990 are expected to be increased by as yet unfunded programs.
    - New Sector Suite system for the replacement Air Traffic Control System.
    - Additional hardware systems for Treasury's Tax Processing Redesign.
    - Commitments for Class VI and VII supercomputers for the Department of Energy.
- The new systems acquisitions, including the majority of systems integration programs, become predominantly Defense oriented, beginning in FY 1985, with Air Force acquiring nearly one-third of the defense budget.

- Except for FY 1985 and FY 1986, NASA system acquisitions to support the new space initiatives continue at nearly the same level as the Air Force's.
- Although not approved at agency levels in 1984, most civil agency budgets will continue at or higher than FY 1987 to FY 1988, but emphasis is expected to shift to distributed data networks using mini-computers serving clusters of microcomputer-based PCs and specialized workstations with more advanced software.

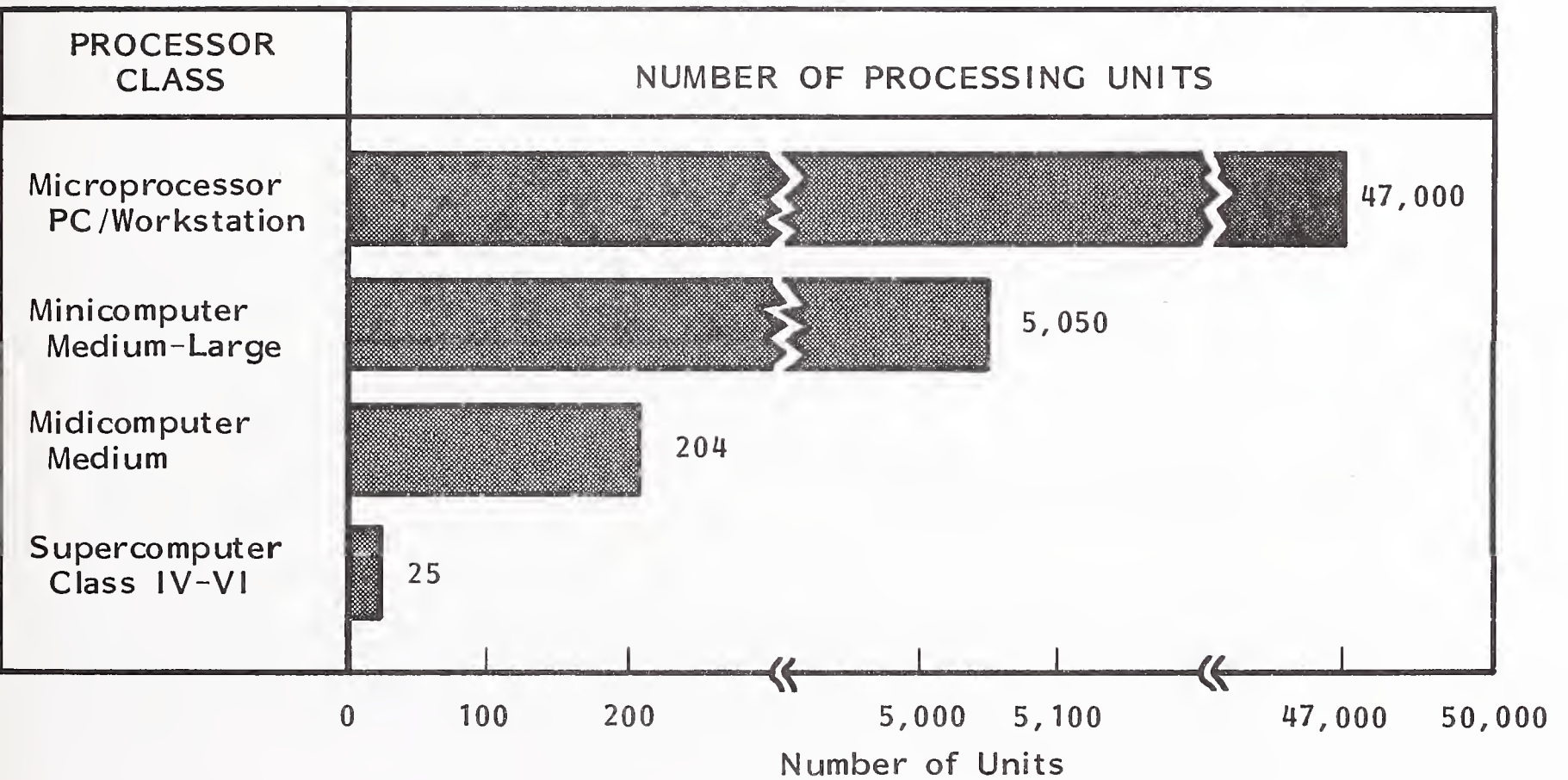
## B.    HARDWARE SYSTEMS

- ADP hardware requirements are only partially defined in the systems integration programs.
  - Under A-109 guidelines, the hardware systems are only functionally described until selection of the final contractor.
  - In the system replacement programs, upward compatibility with existing software is proposed in less than half of the programs.
  - New system acquisitions below the A-109 thresholds do not specify particular brands pending completion of system architecture design.
    - In a number of Defense administrative, accounting, and human resource applications, one vendor will supply minicomputers to several systems with bulk purchase discounts.
- The estimated quantities and relative sizes of hardware requirements proposed are shown in Exhibit IV-1.



# EXHIBIT IV-1

## ESTIMATES OF REQUIRED PROCESSING HARDWARE FOR SYSTEMS INTEGRATION PROGRAMS





- The number of microprocessors, consisting of PCs and specialized workstations, accounts for only the planned major systems. The number of microprocessors to be acquired for a variety of smaller applications may be 10 times higher.
- The already large government inventory of minicomputers is expected to at least double over the next five years.
  - . Some will serve clusters of microprocessors as network nodal processors or concentrators.
  - . Others will be employed as communications controllers and large memory interfaces.
- Medium to large computers are planned as DBMS and RDBS hosts and intermediary processors for the supercomputers.

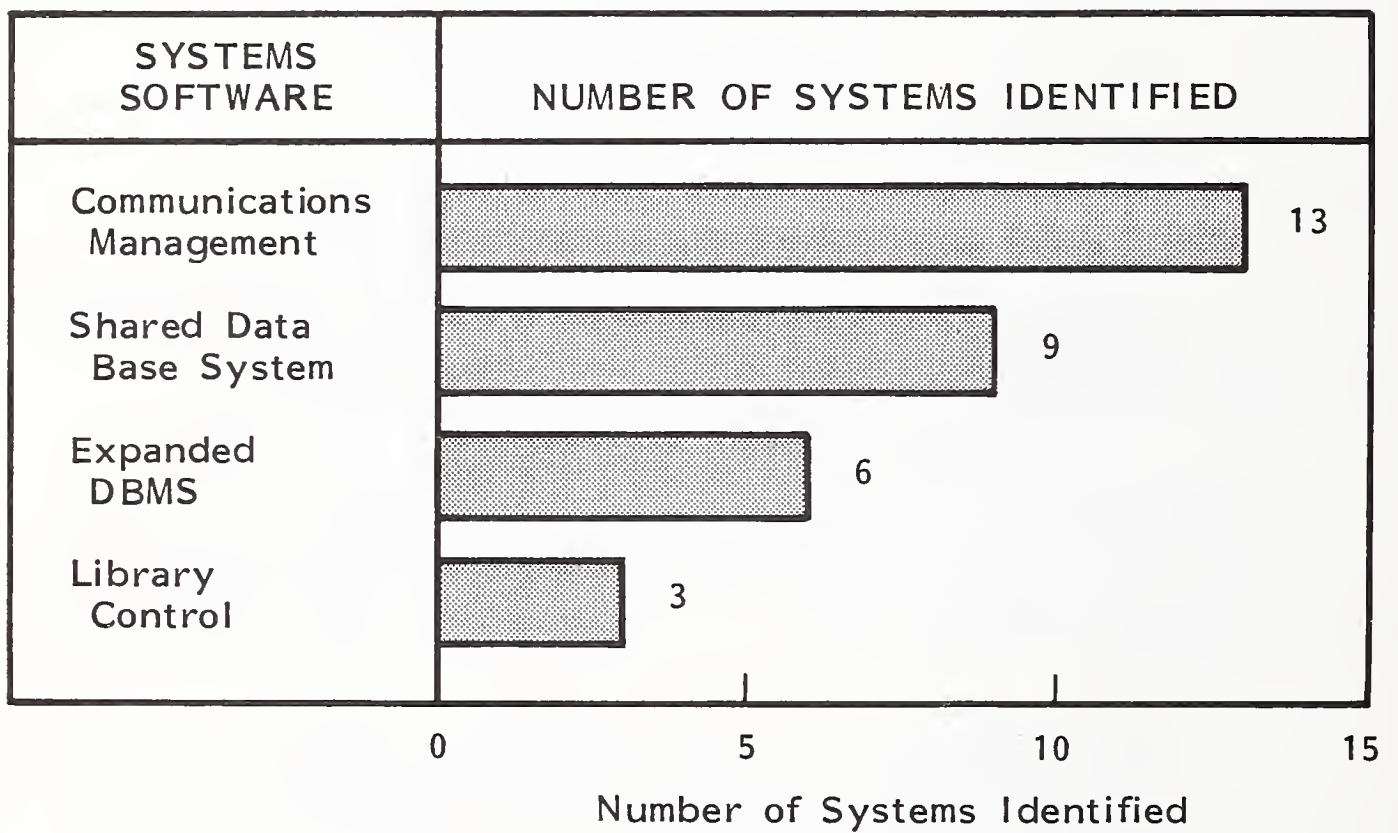
### C. SYSTEM APPLICATIONS

- A wide variety of applications are listed in the reference documents and the interviews for systems integration programs. For convenience of discussion, the information has been divided into three categories:
  - Operating systems.
  - General applications.
  - Other applications.

- Operating system software, other than that provided with a basic hardware system, is listed in Exhibit IV-2. The definitions are noted in Appendix B of this report.
  - The number of systems identified are to be considered representative of the requirements of systems within the FY 1985 to FY 1990 period.
  - Communications management packages will increase with the growth of distributed data processing networks around mid-sized CPU hosts.
  - Shared data base applications and expanded DBMS reflect the agency plans to support networked systems.
  - Library control software needs may be the initial step to both retaining applications in the host machine and downloading programs when required (similar to current RCS vendor offerings).
- General category applications examples are illustrated in Exhibit IV-3. Again, the number identified should be considered only representative of systems integration requirements.
  - Information analysis, human resource, and office automation applications are indicative of the shift to better automation of data collection and analysis by the agencies.
  - Graphics applications on larger systems, in addition to the standalone integrated graphics systems, continues to increase in a number of agencies for both data displays and mapping.
  - Logistics and distribution, as well as accounting applications, are part of the system upgrade initiatives of the Defense Agencies.

# EXHIBIT IV-2

## OPERATING SYSTEM SOFTWARE ADDITIONS FOR SYSTEMS ACQUISITION PROGRAMS



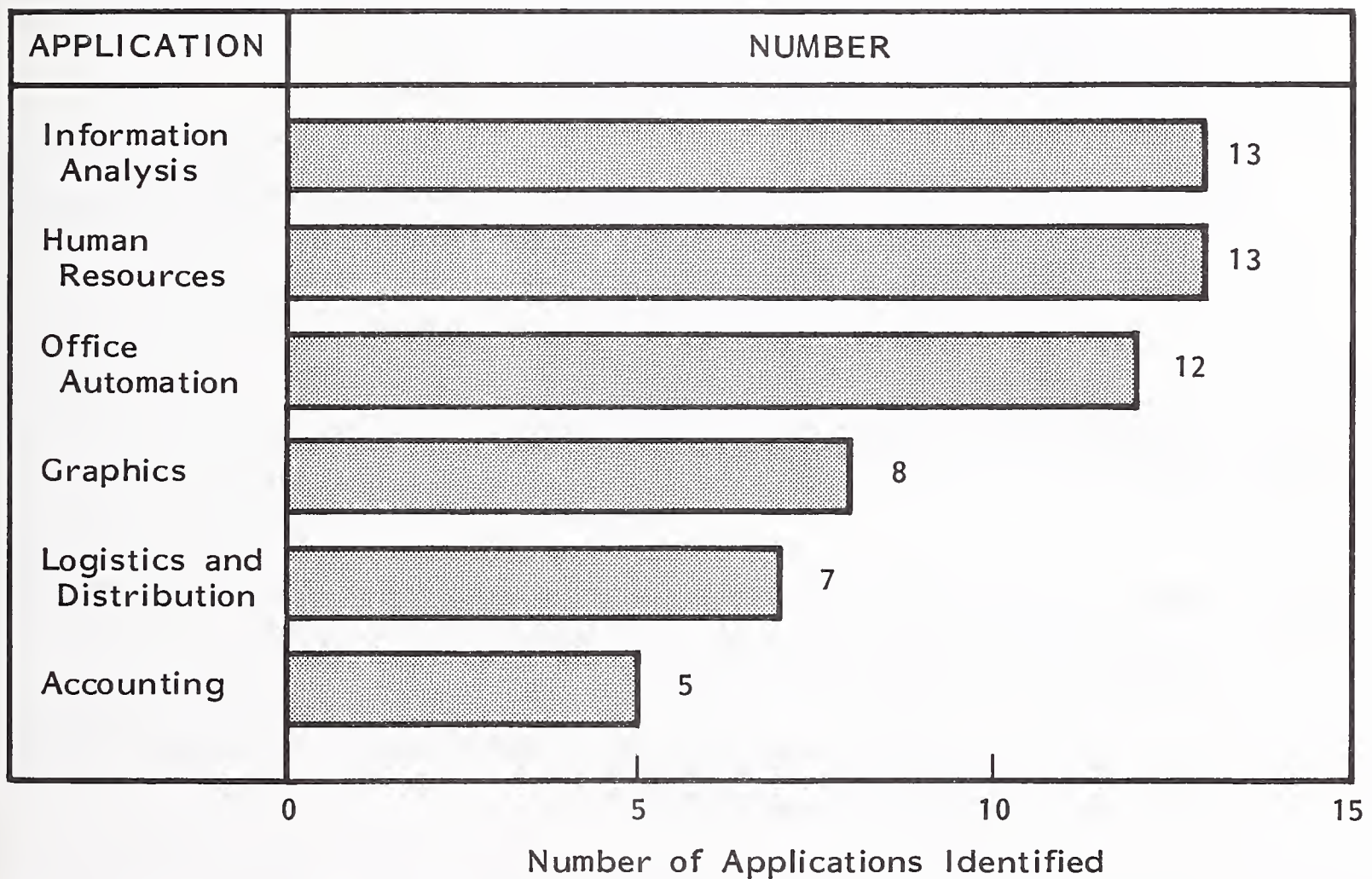
Note: See Exhibit C-2 for Categories

# EXHIBIT IV-3

## INFORMATION PROCESSING APPLICATIONS PROPOSED FOR SYSTEMS ACQUISITION PROGRAMS

(A)

### General Categories



Note: See Exhibit C-2 for Categories.



- Other categories of applications, as defined in Appendix B, Exhibit B-2, cover a range of management and technical applications that do not fit in these general categories. Representative requirements for these applications are displayed in Exhibit IV-4.
  - The marked increase in management and administration systems applications reflects increasing awareness of agency executives to the uses of their information processing resources.
  - The technical support applications are not unusual, since this area continually upgrades and expands ADP resources.
  - The remainder of the applications are not unusual, except for the implied reduction in demand during this period of upgrade of basic operational support systems.

#### D. ACQUISITION PLANS AND PREFERENCES

- Both the agencies and vendors interviewed were asked to comment on their perception of how SI programs are now, and may be acquired.
  - The agency sample included those with prior SI contract experience and those planning SI acquisitions.
  - Agencies sampled also ranged from large SI system acquisitions to smaller SI experience.
  - Only policy officials interviewed were acquainted with the proposed FIRMR and the new FAR.

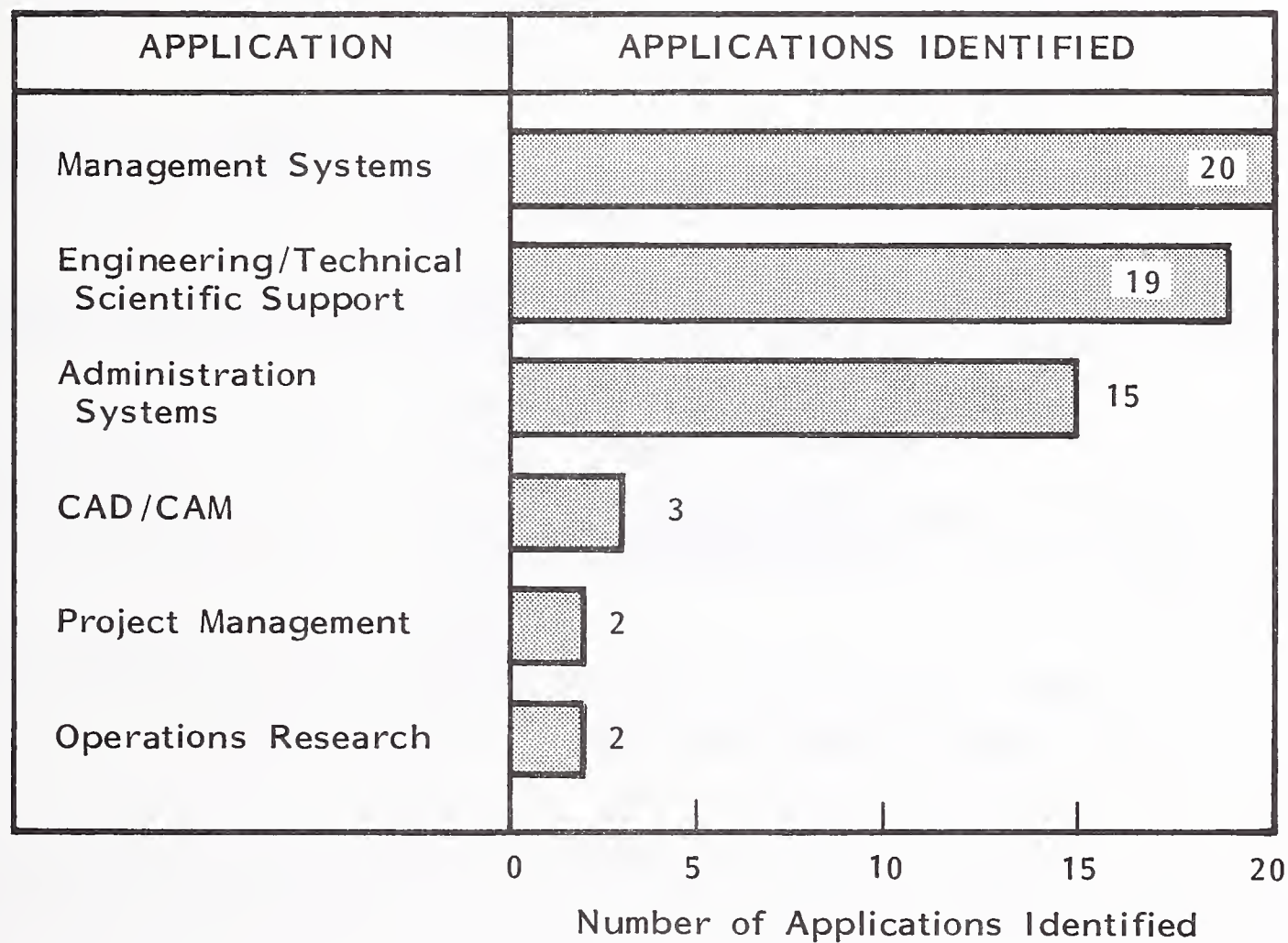


# EXHIBIT IV-4

## INFORMATION PROCESSING APPLICATIONS PROPOSED FOR SYSTEMS ACQUISITION PROGRAMS

(B)

### Other Categories

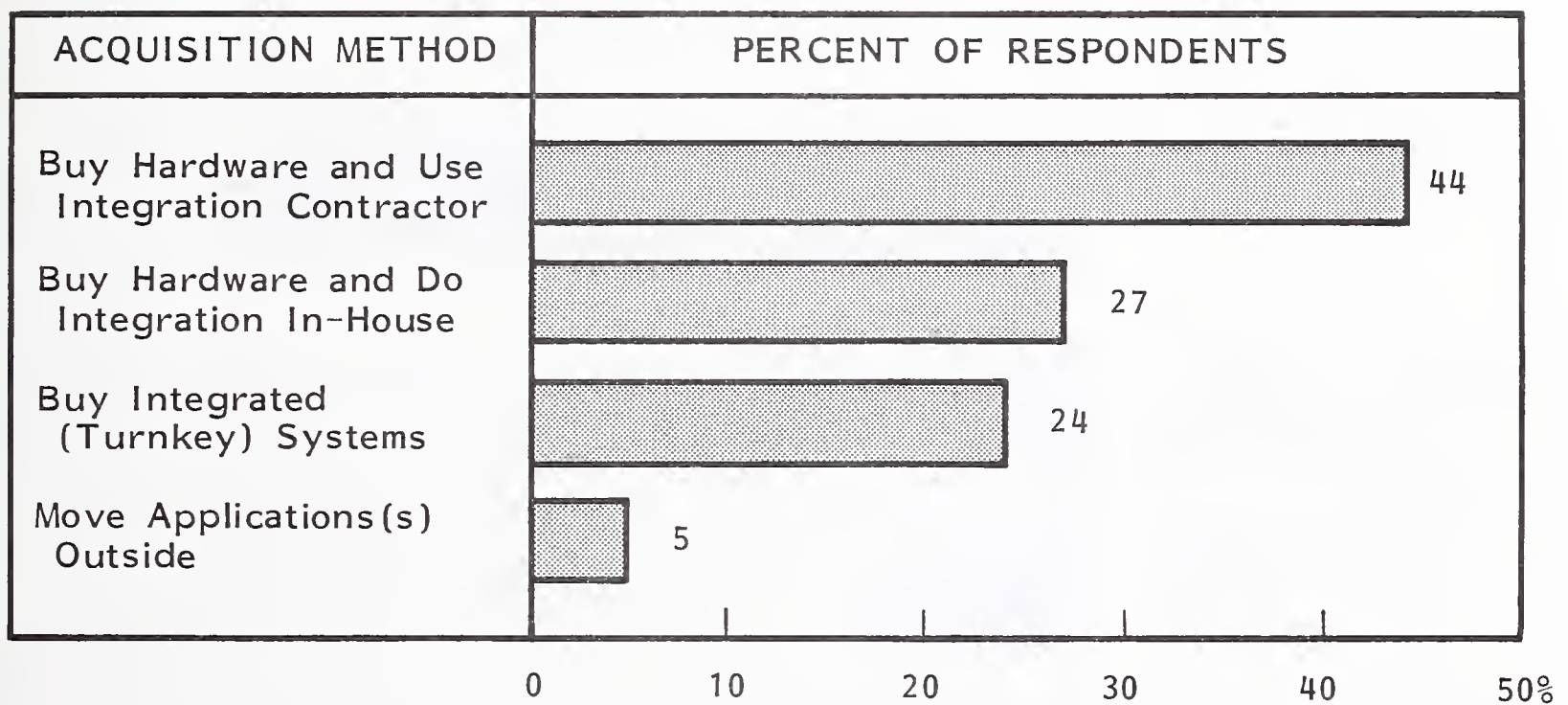


Note: See Exhibit C-2 for Categories.

- Buyers interviewed were familiar with FAR and the predecessor DARs and/or FPRs.
- ADP system users and program managers were either unaware of FAR and FIRMR or had only read news releases about both.
- Nearly half of the agency personnel interviewed preferred "unbundled" or separate acquisition of the system components and use of a systems engineer/integration contractor, as shown in Exhibit IV-5.
  - The remainder were nearly split between the acquisition of a turnkey integrated system and in-house integration.
  - About 5% preferred moving a new application to an RCS or a government data center.
- Agency personnel indicated a clear preference for a fixed-price SI contract vehicle, as shown in Exhibit IV-6.
  - Interviewees felt there was greater motivation to complete the project on time and within budget under fixed-price conditions.
  - Unlike the vendors, only about one-fourth of the agencies favor a mix of CPFF for design and development, and fixed price for implementation.
  - Those who preferred CPFF, Basic Ordering Agreements, or had no opinion were about evenly divided.
  - Only 2-5% preferred fixed price incentive contracts, considered a poor choice by vendors.

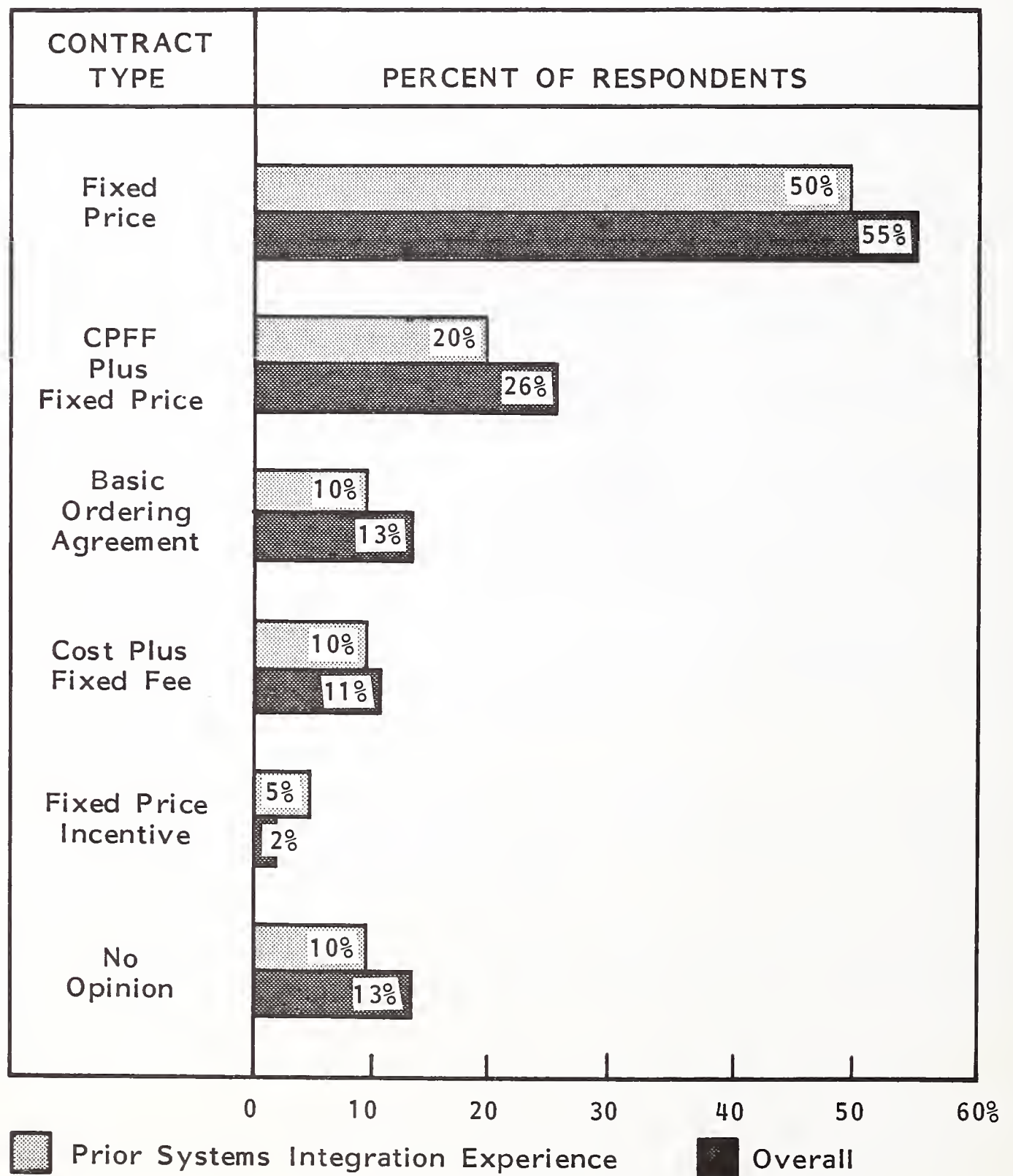
# EXHIBIT IV-5

## AGENCY PREFERENCE FOR SYSTEM ACQUISITION METHODS



# EXHIBIT IV-6

## AGENCY PREFERENCE FOR SYSTEM INTEGRATION TYPE CONTRACT



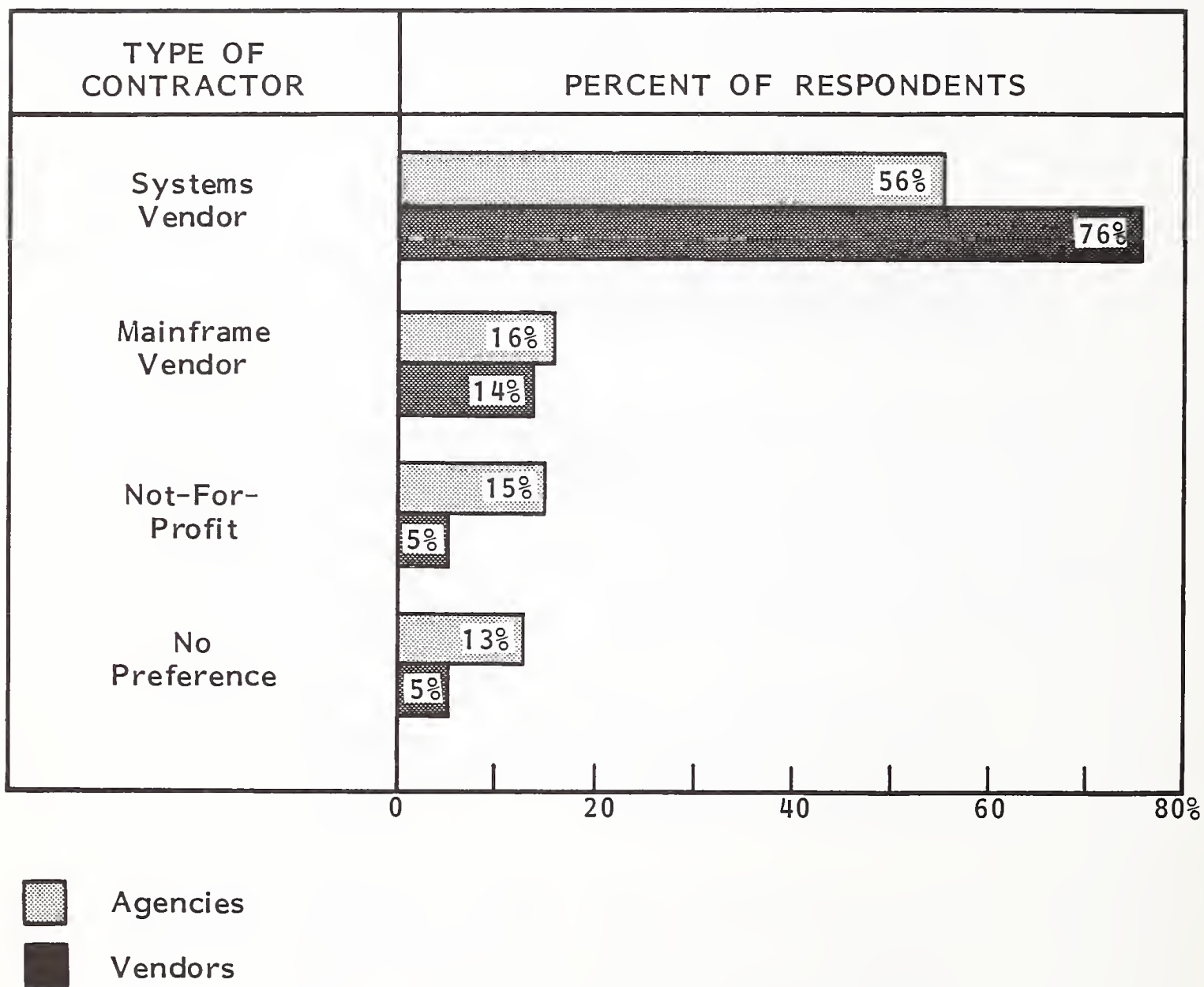


- With the exception of the FPI option, agencies with SI experience were consistently less enthusiastic about all types of contracts. Their increased reluctance was not explained.
- Agencies were almost as strongly in favor of using systems vendors for SI acquisitions as were vendors, as noted in Exhibit IV-7.
  - Agencies with prior SI contract experience felt that the systems vendor made design choices that better supported the agencies' operational needs than the other two sources.
  - Agencies were three times more inclined to use a nonprofit organization as vendors would like, as evidenced by the frequent use of MITRE, RAC, Battelle, and Aerospace Corporation.
- Agencies placed heavier emphasis on the technical solution, life cycle cost, and contract type than on the other three elements, as shown in Exhibit IV-8. Despite lower levels of satisfaction with vendor program/project management (see Exhibit IV-10), agencies did not rank project management as high as the other five key selection criteria.
  - The high ranking of life cycle cost and contract type is considered a reaction to the budgetary conflicts encountered on the way to project authorization and funding.
  - Risk containment gains importance under CPFF-type contracts (according to the buyers interviewed) because the government is assuming a higher proportion of the risk than under FP contracts.
  - A comparison of the relative ranking of the selection criteria by agencies and vendors is included as Exhibit II-2 in Chapter II, Executive Summary.



# EXHIBIT IV-7

## PREFERENCE FOR TYPE OF SYSTEMS INTEGRATION CONTRACTOR



## EXHIBIT IV-8

### SELECTION CRITERIA SIGNIFICANCE FOR SYSTEMS INTEGRATION CONTRACT AWARD

RANK	CRITERION
1	Technical Solution
2	Life Cycle Cost
3	Contract Type
4	Risk Containment
5	Initial Cost
6	Project Management

Note: Ranking based on average of the level of information of agency respondents

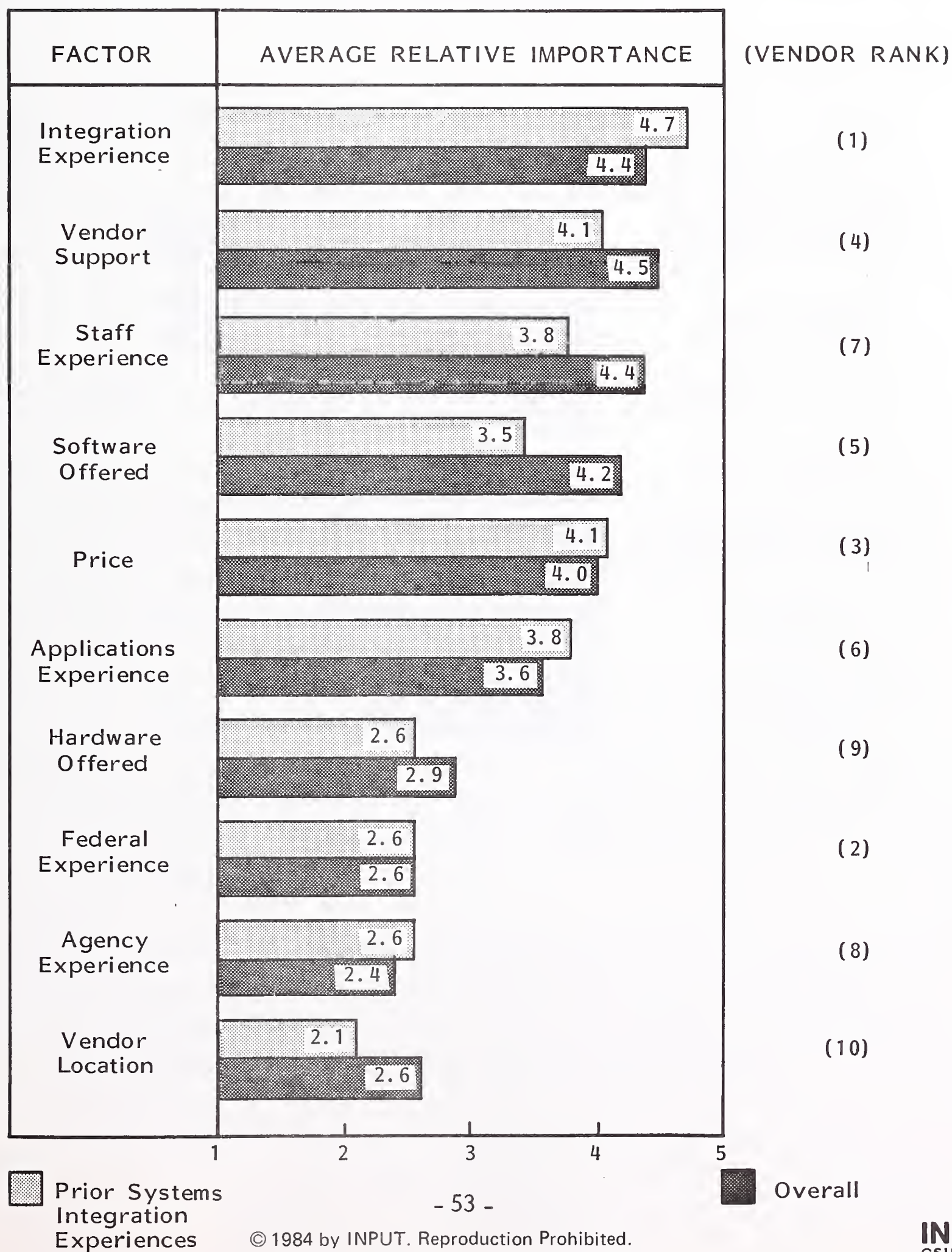
## E. VENDOR PERFORMANCE

- Agencies and INPUT clients suggested some variance of opinion about performance criteria and level of satisfaction in pre-research discussions. The vendor ranking of the relative importance of performance characteristics can be seen in Exhibit V-6 in Chapter V; the relative importance to agencies with prior SI contract experience and the importance across the agency sample are shown in Exhibit IV-9.
  - A cross-comparison exhibit was too complicated to illustrate the differences, so the comparable vendor ranking is shown on the right of Exhibit IV-9.
  - Both agencies and vendors concur that integration experience is most important and vendor location is least important. Location was more significant a decade ago under the former ASPRs.
  - There are wide differences of opinion on the relative importance of staff experience and federal government experience, but the remainder of the characteristics vary by only one or two levels of importance.
  - Agencies with prior SI contract experience did not vary from the overall agency ranking of most characteristics, but did agree with vendors on the relative importance of price.
- The second comparison dealt with the perceived level of satisfaction with the work of systems integration vendors, and the agency ranking is listed in Exhibit IV-10. The vendor rating is shown in Exhibit V-7 in Chapter V, but the ranking has been added on the right edge of the agency exhibit (Exhibit IV-10) for comparison.



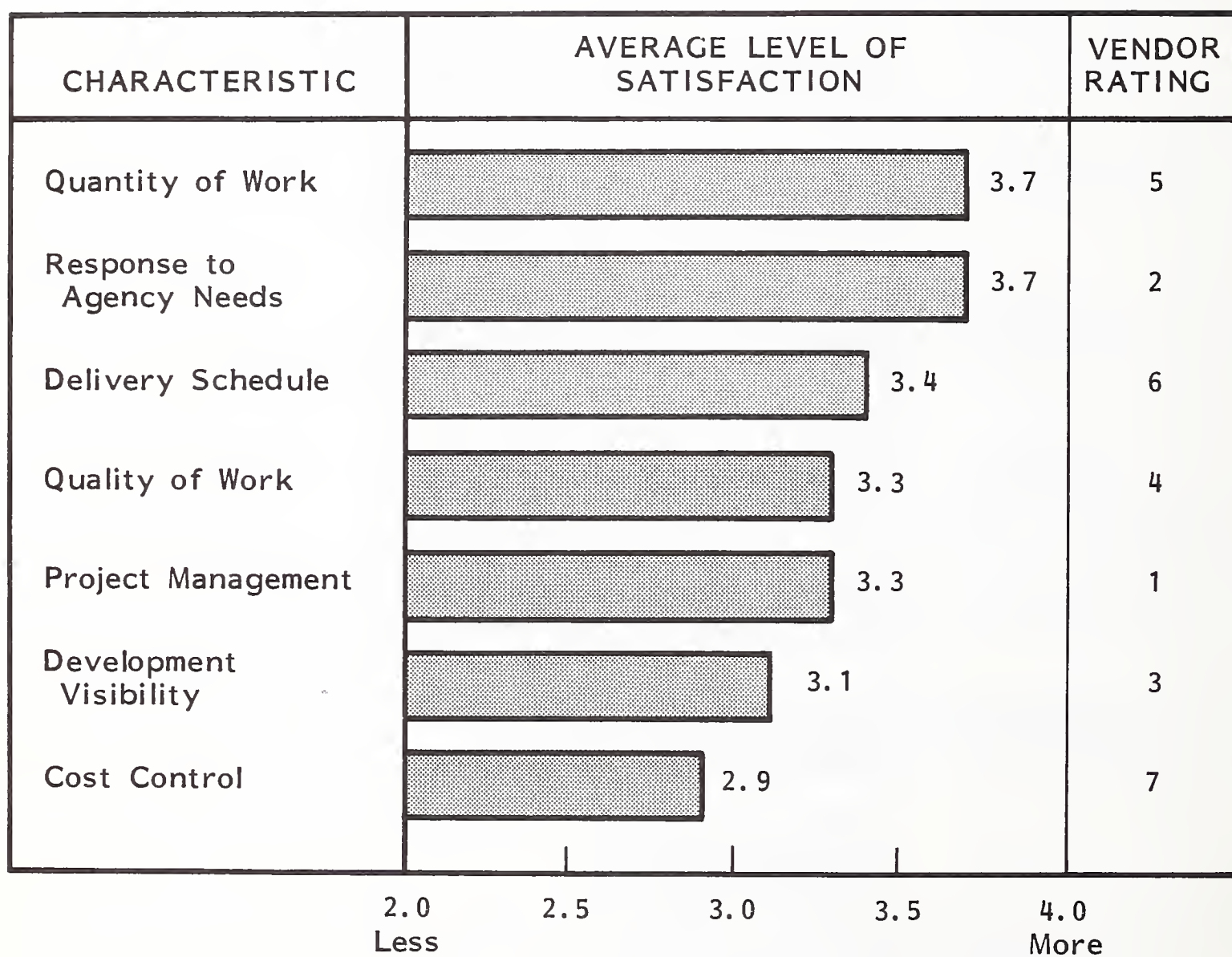
# EXHIBIT IV-9

## IMPORTANCE OF SYSTEMS INTEGRATION CONTRACTOR PERFORMANCE CHARACTERISTICS



# EXHIBIT IV-10

## LEVEL OF SATISFACTION WITH SYSTEMS INTEGRATION VENDORS





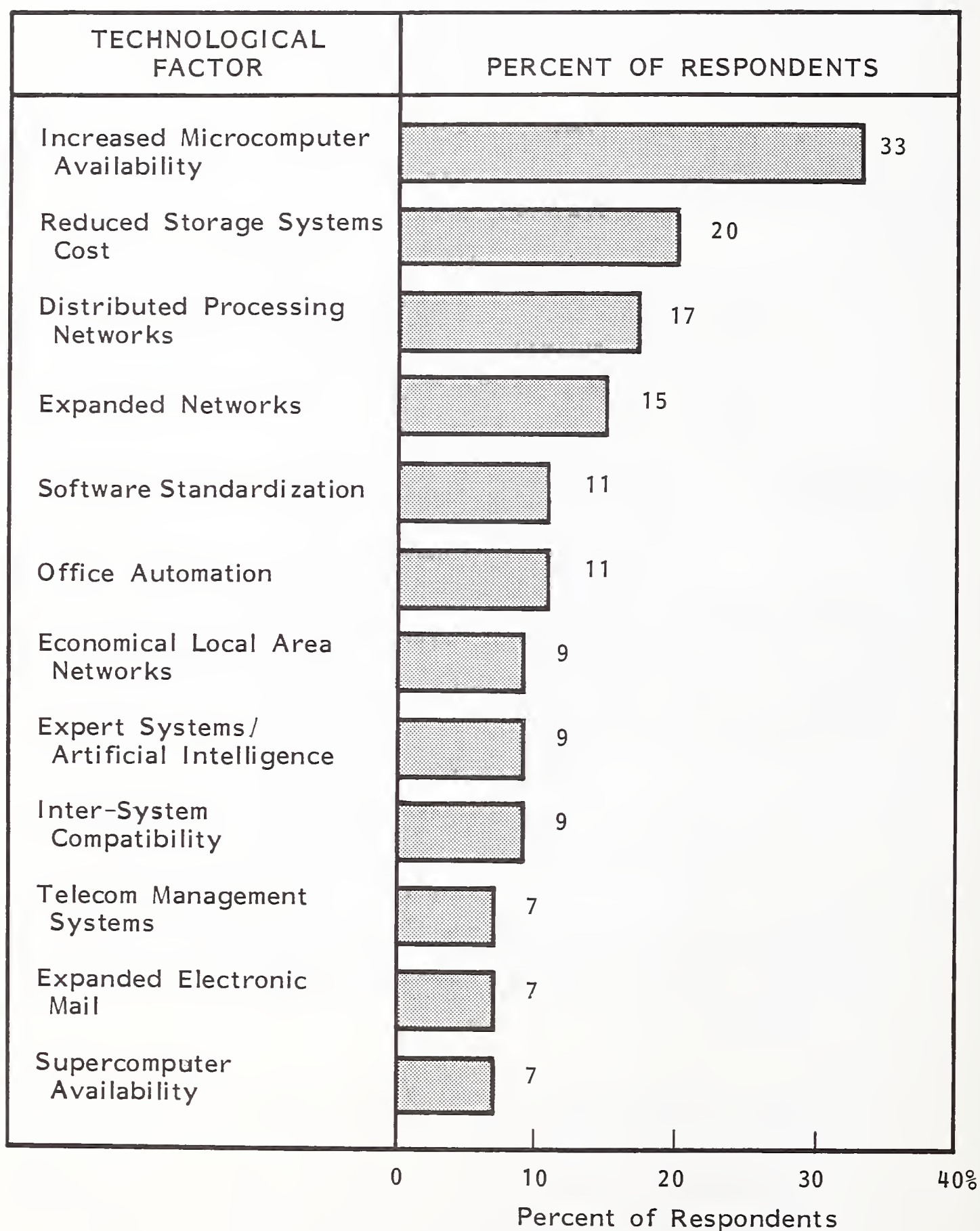
- Vendors apparently agreed with agency levels of satisfaction on Responsiveness, Work Quality, and Cost Control.
- Vendors appear to believe that agencies are satisfied with their project management, but the agencies are not, even though both concurred that it ranked sixth in selection criteria.
- Agencies are also less satisfied with visibility of program development than vendors believe.
- Agencies are substantially more satisfied with the quantity of work than with the quality. They assumed that higher quality levels would be a desirable objective for a successful contractor.

## F. TRENDS

- Agency representatives were asked to identify those technological factors that could or might increase agency utilization of information processing resources. More than 40 factors were identified; the 12 that were named most frequently are listed in Exhibit IV-11.
  - About 33% of the respondents identified increased microcomputer availability as the most important factor in increased ADP usage.
  - Reduced (memory) storage costs, and expanded and distributed processing network availability were considered almost equally important factors.
  - The remaining eight factors include three that are communications oriented, two that suggest the need for software transportability or transparency, and two that involve the advanced technology being emphasized by military and commercial computer research.

# EXHIBIT IV-11

## TECHNOLOGICAL FACTORS THAT COULD INCREASE AGENCY UTILIZATION OF INFORMATION PROCESSING RESOURCES

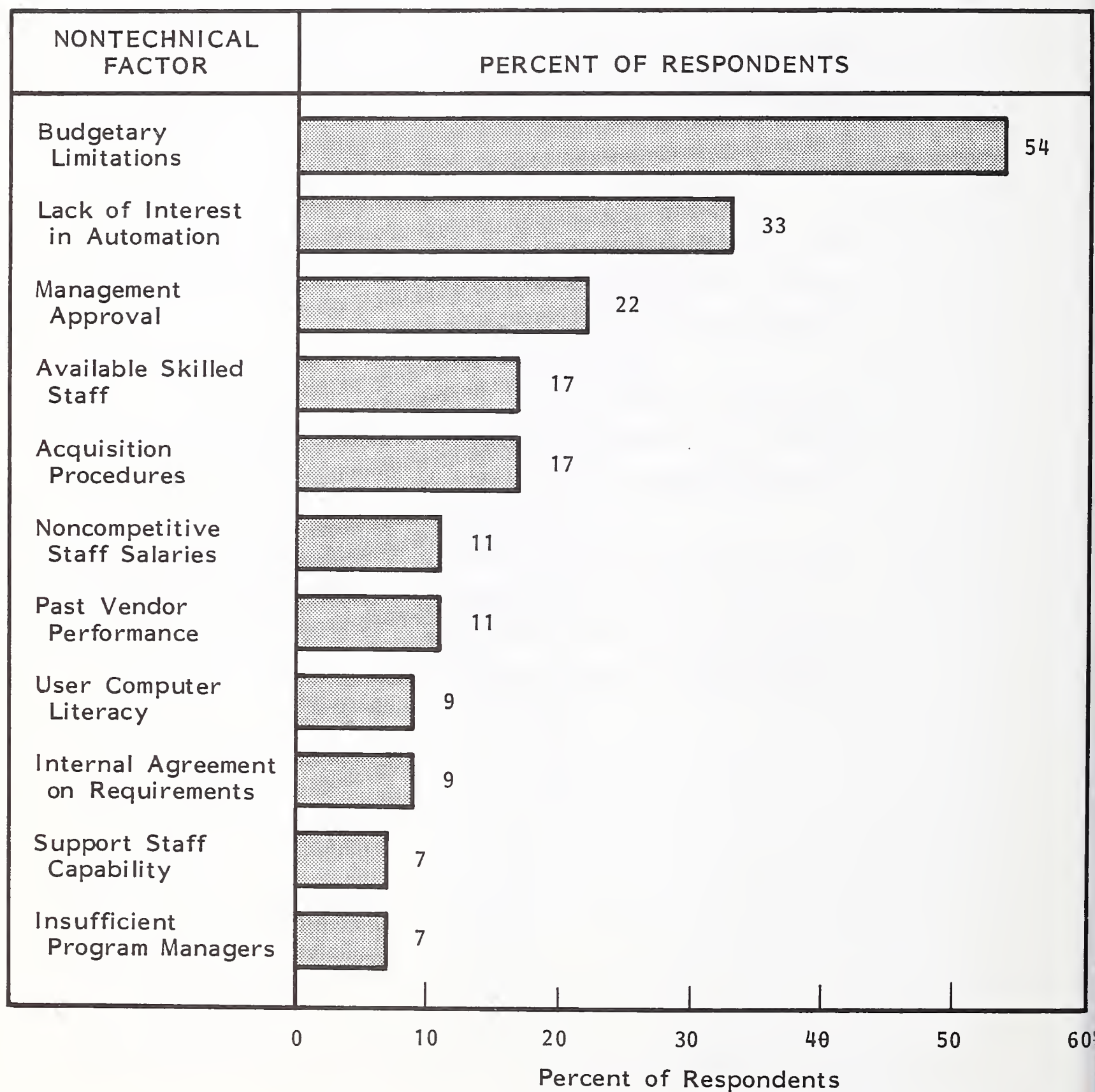


- Agencies were also asked to identify those non-technical factors that tend to impede increased systems acquisition. The nearly 50 suggestions have been combined into 11 factors in Exhibit IV-12.
  - As noted in Chapter III, Market Analysis and Forecast, more than half of the respondents identified budgetary limitations of various kinds as the largest single obstacle. Limitations in funding are also contributory to the lack of available skilled staff and the difficulty in retaining them.
  - Both lack of internal concurrence and management interest in extending information automation represent the next largest restraint to increased systems acquisition and utilization.
  - Complex acquisition procedures, insufficient numbers of program planners and managers, coupled with less than desirable levels of user computer literacy, can be coupled to make a third blockade.
  - Past vendor performance probably stands alone; it frequently occurs and is just as frequently justified by lowest price awards, inadequately defined requirements, and contract terms and conditions that are more complex than the system being developed.



# EXHIBIT IV-12

## NONTECHNICAL FACTORS THAT IMPEDE INCREASED SYSTEMS ACQUISITION



V SYSTEMS INTEGRATION VENDORS





## V SYSTEMS INTEGRATION VENDORS

### A. MARKET SHARE

- The long delays encountered by most agencies in launching large systems integration projects in the early 1980s favored defense systems integration vendors.
  - The top 10 vendors developed most of their revenue base on programs continued from the late 1970s.
  - The mix of systems integration programs was heavily concentrated in defense and space initiatives.
  - The standing of the top 10 vendors, based on reported 1983 revenue, is indicated in Exhibit V-1.
  - The first-year revenue of programs awarded in 1983 did not significantly increase the base of ongoing programs.
    - Staffing during startup concentrates on design and specification efforts.
    - Related hardware acquisition expenditures lag behind the initial design review phases.

# EXHIBIT V-1

## TOP TEN SYSTEMS INTEGRATION VENDORS IN FEDERAL ADP SYSTEMS MARKET BY NONCAPTIVE 1983 U.S. REVENUE

RANK	COMPANY	REVENUE *
1	TRW	2,000
2	Ford Aerospace	800
3	McDonald Douglas	180
4	Martin Marietta	150
5	Control Data Corporation	110
6	Science Applications Inc.	100
7	Computer Sciences Corporation	75
8	Planning Research Corporation	70
9	Electronic Data Systems	65
10	Boeing Computer Services	25

\* Note: INPUT Estimate

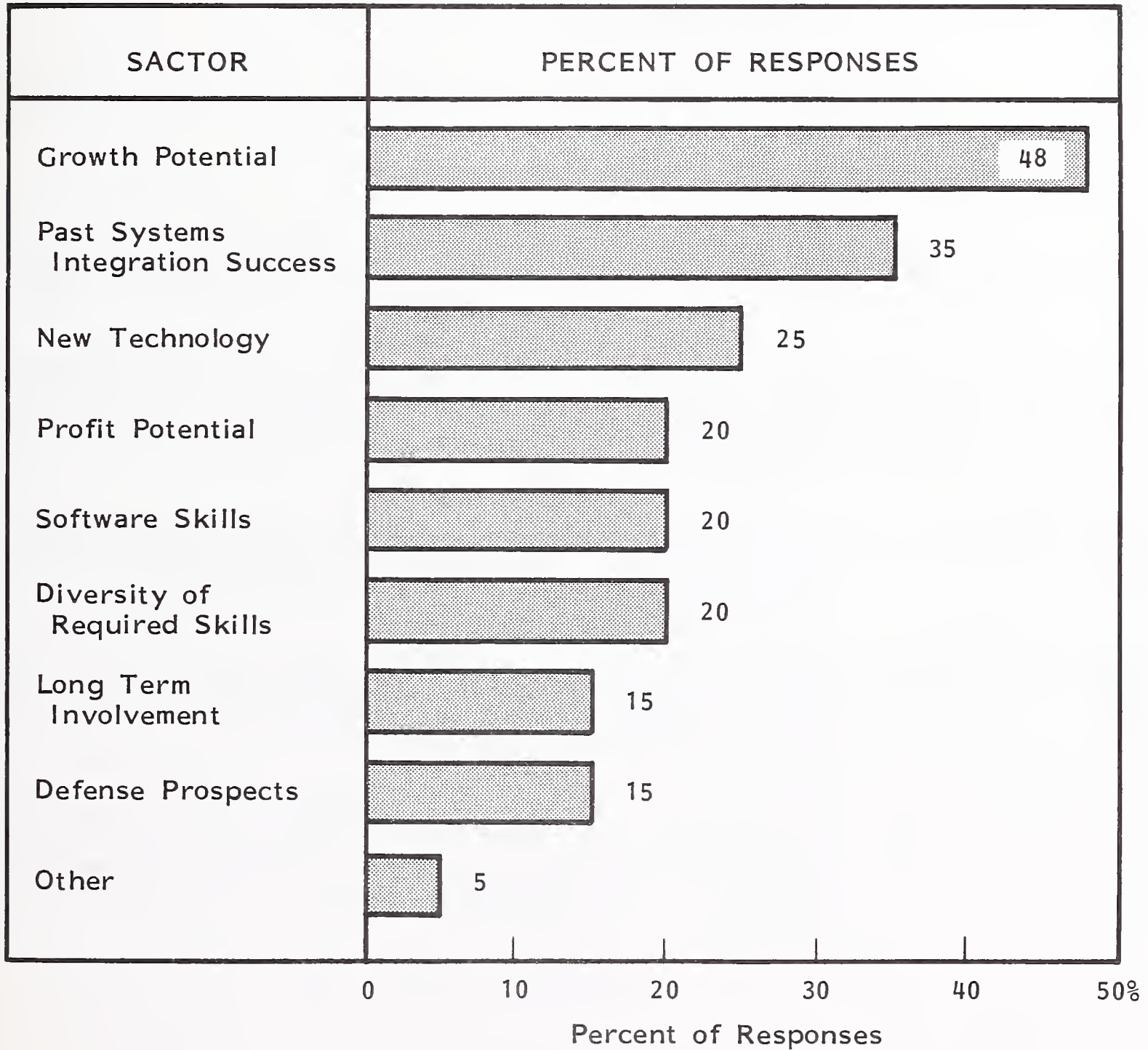
- Program awards in the latter part of GFY 1983 and early GFY 1984 will change the relative ranking of most of the SI vendors.
  - The Army's VIABLE award to the EDS-led team is expected to grow to more than \$1 billion.
  - The Air Force Phase IV award to the Sperry-CSC team is expected to grow to more than \$1-2 billion.
  - FAA's Air Traffic Control Replacement Program is estimated to reach \$10 billion by the year 2000; Martin-Marietta's SE&I contract is valued at \$640 million.
  - Social Security Administration's Systems Modernization Program could exceed the earlier estimates of \$650 million; systems integration contract to EDS may grow to \$100 million.
  - The Navy Inventory Control Point program award to EDS/IBM is estimated at \$350 million, not including code conversion, testing, and work packages.
  - The U.S. Postal Service award to EDS for CAB-SUNSET is estimated at \$200 million.
  - The Navy STAFS award to the CSC/DEC team could grow to more than \$200 million.
  - The WWMCCS Information System Integration contract to GTE has not been estimated, but the program is the largest C<sup>3</sup>I program.
  - The Navy's enlisted Personnel Administrative Support System (PASS) was awarded to Martin-Marietta Data Systems for \$230 million.



- Integrated systems for specialized applications is a much smaller but important segment of the federal IS market.
  - Risk involvement to the agencies is substantially lower.
  - Requirements are better defined and attractive to smaller vendors.
  - C<sup>3</sup> Inc is one of the better known integration specialists in the market.
  - A smaller part of major systems integration vendors' revenue comes from turnkey installations (BDM, CSC, PRC, SAI).
- Both federal and non-federal-government-based vendors are attracted to the systems integration market by its growth potential and related benefits, as shown in Exhibit V-2.
  - Almost half of those interviewed cited anticipated growth as a key factor.
  - Past SI program success was listed by about one-third (without defining what success meant to them).
  - The opportunity to apply new information technology to government needs was the next most frequent factor.
  - Other reasons for remaining in or entering the market included:
    - New procurement policies.
    - Career path prospects.
    - Long-term involvement.

# EXHIBIT V-2

## FACTORS INFLUENCING DECISION TO ENTER OR REMAIN IN FEDERAL SYSTEMS INTEGRATION MARKET



- Unique applications.
  - Contract size.
  - Increasing opportunities for subcontractor specialists.
  - Training prospects.
- A number of vendors voiced concern about the potential role of IBM in the SI market, specifically:
- The existence of a large, obsolete IBM inventory that is not upwardly compatible with most mainframes of other vendors.
  - Future opposition to IBM by the House Government Operations Committee could be less than in the past, considering reduction of IBM government share.
  - Recent changes in IBM pricing strategy offer attractive savings to the government.
  - IBM-only maintenance policies suggest IBM may team with systems or TPM vendors.
  - The IBM move to outside software vendors is accelerating the availability to agencies of a wide spectrum of applications software.

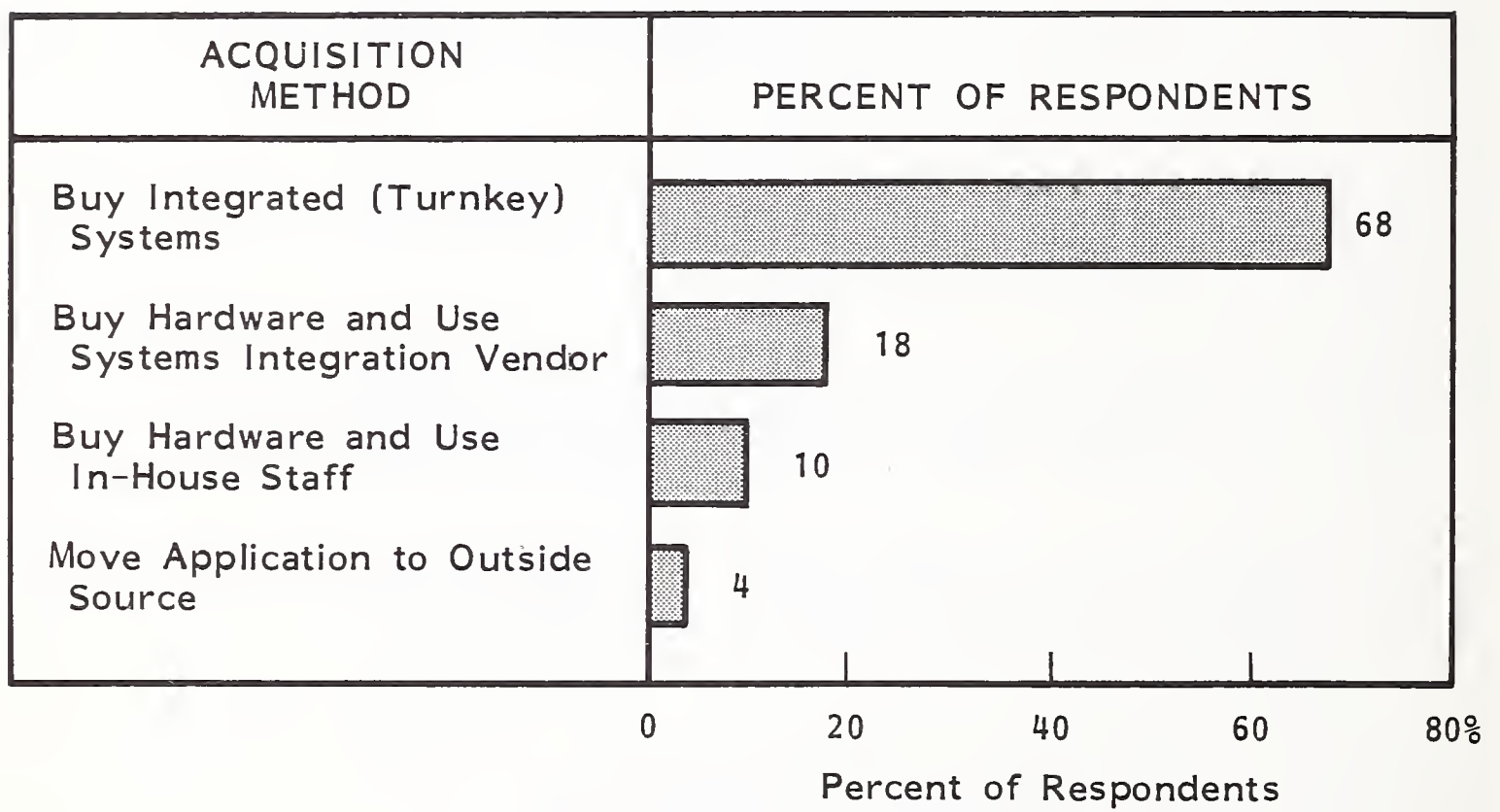
## B. FEDERAL ACQUISITION PRACTICES

- The vendors interviewed were asked to comment on their perception of how the federal government is now, and will be, acquiring SI programs.
  - The vendor sample included large, medium, and small prime contractors and some typical subcontractors.
  - Vendors questioned included both those with and without prior SI experience.
  - At the time of the interviews, the new FAR (Federal Acquisition Regulations) were not in effect.
  - The vendors were not familiar with the proposed rules of the FIRMR (Federal Information Resource Management Regulations).
- Two-thirds of the vendors believe that future ADP systems will be acquired as integrated (turnkey) systems, as shown in Exhibit V-3.
  - The turnkey contractor has prime responsibility, but may use specialized subcontractors and suppliers for:
    - Design.
    - Hardware acquisition.
    - Software development.
    - Site preparation and installation.
    - User staff training.
    - System maintenance (at least during warranty period).



# EXHIBIT V-3

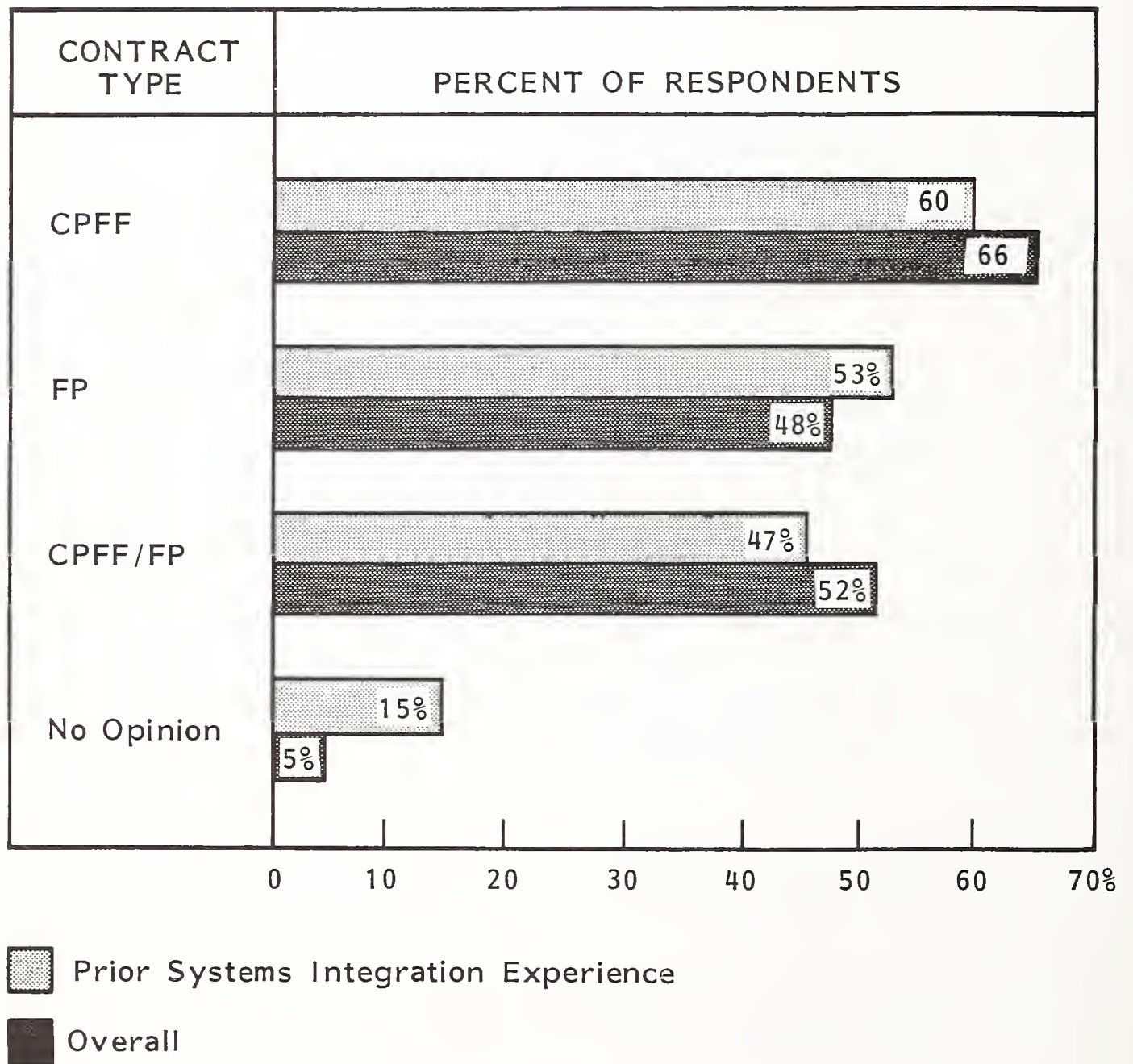
## VENDOR VIEWS OF FUTURE SYSTEMS INTEGRATION ACQUISITION METHODS



- Only about one-fifth believe that the government will use systems engineering and integration (SE&I) contractors.
  - Hardware systems bought competitively by the agency.
  - Separate contracts awarded for site preparation, conversion of existing applications software, validation, and verification.
  - Several respondents noted the increasing SE&I awards to non-profit organizations.
  - Some awards involve nonprofit organizations as SETA experts to review SE&I contract progress.
- About 10% think that some agencies with staff ADP expertise will acquire hardware systems and perform systems integration in-house.
  - The Department of Energy is the major proponent of this approach.
  - Some agencies in the Department of Commerce also plan to do in-house integration.
- Very few see agencies moving new system requirements to outside sources (RCS, COCO, other government data centers).
- About two-thirds of the vendors prefer cost-plus-type contracts for systems integration programs, as shown in Exhibit V-4.
- The long gestation period for the approval and funding of medium-to-large ADP systems is overtaken by changes in system requirements.

# EXHIBIT V-4

## PREFERENCE FOR TYPE OF CONTRACT FOR SYSTEMS INTEGRATION ACQUISITION VENDOR VIEWPOINT



CPFF = Cost Plus Fixed Fee

FP = Fixed Price

- Newer technology available.
  - Increase in number of applications.
  - Conversion of current software complicated by hardware and/or operating system changes.
- About half of the vendors would bid on fixed price contracts, when:
  - Requirements are fixed.
  - Agency has experienced in-house staff.
  - Hardware upgrade is compatible with existing systems.
  - No system currently exists.
- About the same number see a mix of CPFF and FP as desirable when risk-sharing shifts during implementation.
  - Design and development - CPFF.
  - Software production - CPFF.
  - Hardware and maintenance - Fixed Price.
  - Straightforward (upwardly compatible) code conversion - Fixed Price.
- Vendors with good SI experience appear more willing to bid fixed price because they believe they have devised better risk containment procedures.



- Until relatively recently, SI contract awards have generally been made to the lowest (price) bidder. Concern with potential "buy-ins," severe cost overruns, and defaulted contracts led to two-step and four-step negotiated procurement policies on large systems, especially in the Defense Department.
  - Improvements in the FPRs and FPMRs for acquisition of information resources have led to more balanced selection criteria.
  - Vendor response to the relative importance of the six key criteria is shown in Exhibit V-5.
  - Vendor ranking was based on recent experiences with significant programs, and excluded some smaller procurements that deviated from the standard pattern of procurement.
    - Risk containment measures have become increasingly important to both buyer and bidders.
    - Especially with large, multiyear acquisitions, life cycle cost has become a key factor.
      - Vendor maintenance is required after implementation.
      - Systems are susceptible to frequent changes in application.
      - Systems should be capable of growth without major rework.
    - Unless otherwise limited by the RFP, bidders can propose alternate contract types.

EXHIBIT V-5

SIGNIFICANCE OF SELECTION CRITERIA  
FOR SYSTEMS INTEGRATION CONTRACT AWARD

RANK	CRITERIA
1	Technical Solution
2	Risk Containment
3	Life Cycle Cost
4	Initial Cost
5	Contract Type
6	Project Management

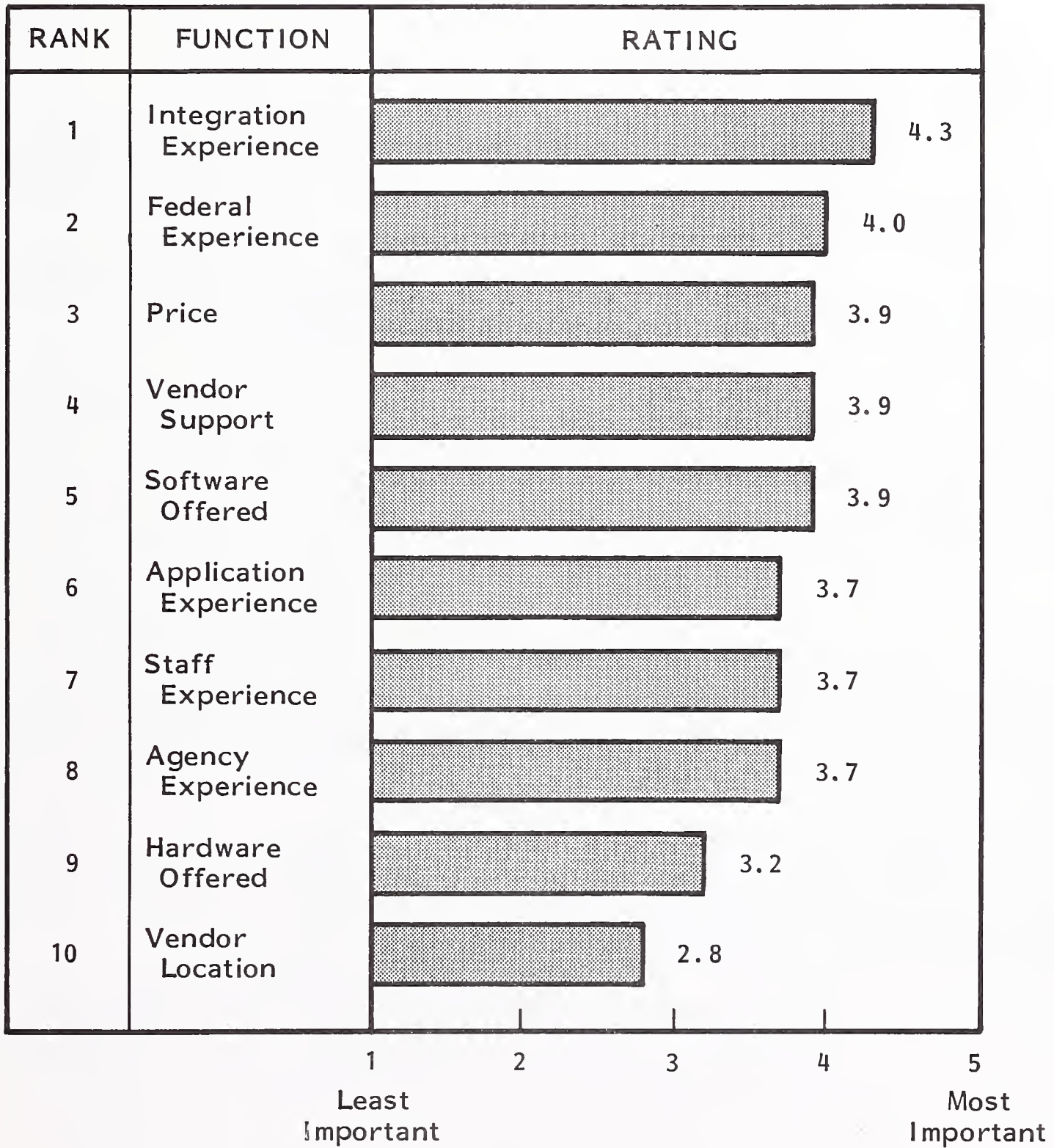
- . Vendors see project management as significant but not essential to systems acquisition.

### C. VENDOR PERFORMANCE

- In pre-research discussions with agencies and clients, there appeared to be some variance in opinion about contractor performance on past and current SI programs. From lists compiled with both groups, performance areas were chosen for inquiry. Vendor perceptions are ranked in importance in Exhibit V-6.
  - Prior integration experience and its benefit to overall contract performance was rated most significant by vendors and experienced agencies.
    - . Sound engineering practices were employed.
    - . Problem areas were identified early.
    - . Contractor provided better visibility of progress to agency.
  - Vendors believe that federal contract experience is next most important, although ranked eighth by the agencies.
    - . Federal contract procedures are more complex than commercial.
    - . Documentation delivery throughout the contract is more rigidly observed.

# EXHIBIT V-6

## VENDOR RATING OF IMPORTANCE - SYSTEMS INTEGRATION VENDOR PERFORMANCE CHARACTERISTICS





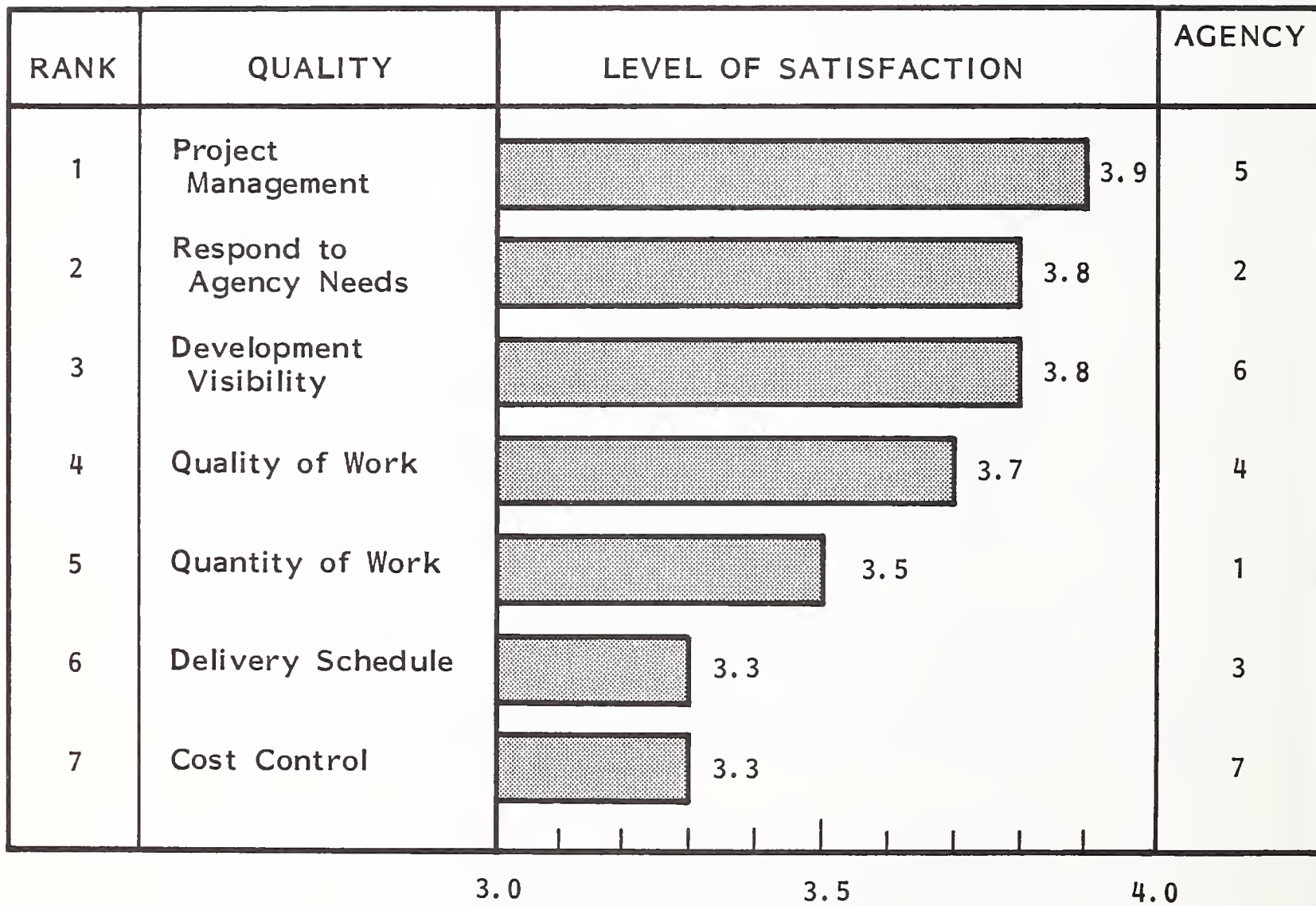
- Federal contracts include a number of socio-economic features not found in commercial contracts.
- Price, vendor support, software offered, and experience were held as equally important, but with somewhat more emphasis on price.
- Price was interpreted as staying reasonably close to the bid figure without consideration of agency-directed or contractor-proposed changes.
- Experience with the intended applications, the agency and its mission, and the contractor staff backgrounds were also similar in importance.
- Rapport with the agency project team and the ultimate user is more rapidly established and easier to maintain.
  - Operating objectives are better understood and met by the system.
  - Program execution is smoother.
- Hardware systems have less importance to the vendor:
  - In replacements, the selected hardware tends to be compatible with the existing system.
  - In new systems, hardware and hardware systems were selected or defined in the design phase.
- The importance of vendor location, once a major criterion in the 1970s, is much less significant to both vendors and agencies alike.

- Related to the importance of vendor characteristics is the agency's level of satisfaction with specific areas of vendor performance. Seven criteria were selected for evaluation by both groups. Vendor perceptions of the agencies' level of satisfaction are indicated in Exhibit V-7.

- Project management is seen by most of the respondents as most significant.
  - Defaults occur when vendors fail to adequately manage the project.
  - Agencies react more favorably to strong project management.
  - Successful SI vendors believe agency satisfaction with project management was a key factor for success.
- Responsiveness to agency needs and agency visibility of progress and problems were viewed as next most satisfying on successful projects. Agencies were more amenable to schedule adjustments and contract changes when satisfied with performance in these areas.
- Quality of the work was held as more significant than quantity, since quality generally minimizes costly rework to overcome errors, especially in software development and interface definition.
- Agencies appear to vendors to be less satisfied with vendors' delivery schedules and cost control. These are the most visible outward signs of project progress and open to criticism from a wider spectrum of government oversight groups.

# EXHIBIT V-7

## AGENCY LEVEL OF SATISFACTION WITH SYSTEMS INTEGRATION VENDORS - VENDOR VIEWPOINT



## D. TRENDS

- The vendors interviewed were asked to identify technical and non-technical trends that might influence the federal marketplace and systems integration procurement specifically. As should be expected, the perspectives varied with the primary level of business and degree of involvement in SI.
- Technical trends that were identified were of a wider variety than non-technical. In descending order of frequency of mention, there were seven principal trends:
  - Microcomputer revolution or expansion was cited the most often:
    - Rapid increase in the number of personal computers in the government will shift information processing to the user.
    - Use of microcomputers will emphasize software transportability.
    - Increasing use of PCs will accelerate the need for English language commands and instructions.
    - With the aid of economical LANs (Local Area Networks), density of PCs will accelerate implementation and use of distributed processing.
  - Communications media and networking processes will undergo significant changes.
    - AT&T breakup and escalating telecommunications could foster creation of a federal data communications network.



- Interconnectivity of systems will be emphasized for rapid data transfer. There will be:
  - Development of transparent networks and/or standard protocols.
  - Early implementation of fiber optic systems.
  - Imposition of federal data telecommunication standards.
- Increased emphasis on development of expert systems and artificial intelligence by the military will be aided by similar demands of the regulatory agencies.
- Demand is increasing for more flexible DBMS and development of relational data base systems to:
  - Reduce paperwork generation.
  - Open data bases to manager-operated PCs.
  - Simplify intra- and inter-agency data transfer.
- There is related interest in faster, cheaper large-memory systems, with demand exceeding the development rate of optical techniques.
- Reduction in demand is seen for large, centrally located CPUs. Substitution of upgraded minicomputer-to-microcomputer networks will:
  - Require more efficient software.
  - Increase demand for graphics capability to improve visualization of the data.
  - Feed back to the need for standard, economical networks.

- Increasing emphasis will be placed on automated software production and the use of functional commands that are either symbolic or voice recognized.
- Non-technical factors that will impact the direction and rate of growth of SI acquisition were less diverse but considered more significant to the 1985-1990 era.
  - Budget trends and widespread concern with potential actions by Congress and the Federal Reserve were the most significant citations:
    - Some deficit control measures could markedly reduce ADP budgets across all agencies, as typified by the past several years.
    - Any reduction in U.S.-USSR tensions may sharply reduce defense spending in all categories.
    - Unless opposed successfully by the unions, a reduction in the government workforce could accelerate vendors' introduction of new ADP technologies.
  - A change in administration with this election could shift federal spending back to domestic programs and deemphasize defense and technological programs.
  - AT&T deregulation and the resurgence of IBM in the marketplace could quickly reduce the competition to subcontractor status (if they remain in business).
  - Imposition of the new FIRMR needs training of more ADP/telecommunications-oriented acquisition and contracting personnel in the government.

- Foreign competition in both ADP and telecommunications could more rapidly drive down the price of hardware, and later, software. This would improve cost/benefit to the government.
- Congressional micro-management of ADP continues to change the balance of competitive forces in the marketplace:
  - . The "Buy-Not Lease" provision of the 1984 Defense Appropriations Act will negatively impact leasing vendors and improve prospects for SI vendors.
  - . OMB will continue its reluctance to enforce a single set of acquisition regulations on all agencies with no exceptions.
  - . Congress will become more interested in forcing a range of socio-economic contract terms on a high-technology industry.
  - . Endless studies and investigations of every major system acquisition will be fostered, including the political aspects of new system features.

## VI SYSTEMS INTEGRATION OPPORTUNITIES





## VI SYSTEMS INTEGRATION OPPORTUNITIES

### A. PRESENT AND FUTURE PROGRAMS

- The funding for SI programs appears in at least three different but inter-related documents generated within agencies of the federal government:
  - Agency long-range ADP or Information Resource Plans, which usually cover five years.
  - OMB/GSA Five-Year Plan, which is developed from agency budget submissions to OMB under Circular A-11, Sections 43 A & B, for both the budget year and five years out.
  - Agency annual Information Technology budgets, which are spread out among the different budget items in the Agency's Budget Request.
- Except for details presented to the appropriate committees of both houses of Congress for program authorization and funding appropriation, most medium and large program intentions are rarely discussed in detail in public. The exceptions are the briefings to industry by Defense and NASA, and at times, by Transportation.
- Non-Defense contractors are encountering increasing difficulty in reviewing defense-related acquisition plans prior to notices in the CBD. Program

Element descriptions for Defense research and development projects are no longer available from NTIS, but from DTIC.

- To provide some measure of the SI market potential, this section includes a partial listing of programs already under contract and those identified as initiating in GFY 1984 to 1988. The list is not all-inclusive.
  - GFY 1982 and 1983 programs have "out-year" funding in GFY 1984 to 1988 as "Continuing Programs," which increases the annual budget values.
  - GFY 1984 programs include some that have been awarded and others that are still in the initial acquisition stage.
    - Funding reductions in the 1984 budget have or will slip some of these programs into 1985.
    - Initial-year funding may not be listed until 1985, although solicitation may be scheduled to begin in 1984.
    - A number of programs identified as new leases may become SI acquisitions in GFY 1985, 1986, or 1987, in response to the "Buy-Not Lease" mandate.
  - GFY 1985 to 1988 SI programs have not yet been approved or funded in most cases.
    - Program must be authorized by the appropriate oversight committee.
    - Funding must come in the appropriate Agency Fiscal Year Appropriation Act.

- Deficit or political considerations may slip or cancel the project in its entirety.
- All funding proposals are based on cost data of the year submitted, with inflation factors dictated by the Administration as part of its Fiscal Policy, and are subject to revision, reduction, or spread to future years in response to Congressional directions.
- The list of SI programs by fiscal year becomes smaller after FY 1985 because new programs have not yet been identified or initially approved by the responsible agency. Subsequent issues of this report and the INPUT Procurement Analysis Report will include additional programs in the FY 1987 to 1988 timeframe and new programs in FY 1989 to 1990 as identified.

#### **B. CURRENT PROGRAMS - FISCAL YEAR 1982-1983**

- Recent awards of SI programs with out-year funding include, but are not limited to, the following:
  - Air Force: Phase IV: Replacement of air base logistics and administrative ADP-Sperry/CSC - \$1 to \$2 billion.
  - Army: VIABLE (Vertically Integrated Automated Base Logistics Equipment): Replace Army base computer systems - EDS/Amdahl/IBM/ADR - Initially \$690 million - could go to \$2 billion.
  - Navy: Inventory Control Point: Upgrade/replace Navy inventory ADP-3 to 4 contracts: Integration and equipment - EDS/IBM - Initially \$350 million - future growth undefined.



- Transportation/FAA: Replacement of the 914 National Air Space System - previous contracts awarded for advanced technology to RCA; SE&I contract - Martin Marietta \$640 million; subsequent contracts for Rehost (Interim) Computer and advanced Sector Suite System - overall program estimated at \$10 billion through 1999.
- Commerce/Patent and Trademark Office - Automation of the patent examination, trademark, copyright, and related library systems: MITRE contracted for SETA; PRC/CAS for Systems Engineering and Integration \$38 to \$60 million; 6 more contracts to be awarded.
- Navy/NIF: STAFS (Standard Accounting Finance System) for 14 Navy Labs: Awarded to CDC/DEC initially for \$38 million, with options may exceed \$200 million.
- Air Force/AFCAC/AFLC: Maintenance Job Tracking (for engine overhaul and aircraft maintenance): Ford Aero - estimated at \$19 million, but still in prototype evaluation.
- Air Force Space Command: Shuttle Processing and Operations Center: Awarded to Lockheed - amount unknown.
- Air Force/Joint Program Office: WIS (Worldwide Military Command and Control System Information System): Systems Engineering and Integration awarded to GTE with unpriced options; equipment, software, remote facilities yet to be contracted; estimated at \$1 billion plus. Each military department will provide components, yet un-awarded.
- Postal Service: Cab Sunset: Awarded to EDS - \$200 million.
- Labor: Federal Employee Compensation System - Phase II: Awarded to MMDS - initially \$26 million.

- Army: JACS (Joint Uniform Military Pay System Automated Collection System): Initially awarded to Honeywell at \$17 million - re-awarded to HP (value unknown).
- Navy/NSWC: ICSTF (Integrated Combat System Test Facility): Awarded to SysCon - value undetermined.

### C. SYSTEMS INTEGRATION PROGRAMS - FISCAL YEAR 1984

- AF Communications Command: Command ADP Modernization Program (CAMP) FY 1984-1989 - \$310 million.
- AF Logistics Command: Command and Control System (CCS) FY 1984-1985 - \$4.1 million.
- AFSAMTO/WSMC: Consolidated Non-Launch Critical Data Processing (Data Center 1) FY 1984-1988 - \$4.4 million.
- AF Air Training Command: Command Readiness Exercise System (CRES) FY 1984-1988 - \$23.4 million.
- AF-ESD: Command Center Processing and Display Systems FY 1984-1988 - \$21 million.
- AF Air Training Command: Time Related Instructional Management System (TRIMS) FY 1984-1988 - \$10 million.
- AFCAC: Information Systems for Automated Acquisition Control FY 1984-1985 - estimate \$5 million.

- Army Corps of Engineers: CEAP-I (Corps of Engineers Automation Plan/Option I) FY 1984-1988 - \$45.6 million.
- Army Reserve/National Guard: CAMIS (Continental Army MIS) FY 1984-1989 - \$300 million Federal Reserve/\$57.7 million ARNG.
- Army (CSSAA): VFDMIS (Vertical Force Development MIS) FY 1984-1989 - \$45.7 million.
- Office of Personnel Management: Replace Central Computing Facility FY 1984-1988 - \$13 million.
- Navy (CNM/CNR) NRDC (Naval Research and Development Center) Central Computer Replacement FY 1984-1989 - \$27 million.
- Navy Fleet Numerical Oceanography Center: Satellite Processing Center (SPC) Upgrade FY 1984-1988 - \$5.7 million.
- USMC Logistics Management Information System (LMIS) FY 1984-1988 - \$4.6 million.
- DLA (Defense Logistics Agency): ADPER (ADPE Replacement) FY 1984-1989 - \$130 million.
- NASA/Lewis: Replace UNIVAC System FY 1984-1988 - \$8.5 million.
- NASA/JSC: Permanent File System FY 1984-1985 - \$3.7 million.
- DHHS-Social Security Administration: Division of Finance Control System (DFCS) Automation FY 1984 - \$1.4 million.
- Interior/Bureau of Reclamation: Replace Central Computing Facility FY 1984-1988 - \$18 million.

- Justice/Federal Bureau of Investigation: AIDS (Automated Identification Division System) Fingerprint Identification FY 1984-1988 - \$47.7 million.
- Justice/Civil Division: AMICUS (Automated Management Information Civil User System) FY 1984-1987(?) - estimate \$10 million.
- GSA-Office of Personal Property: General Supply fund (ADP Support) FY 1984-1985 - \$2.1+ million.
- Veterans Administration/Department of Medicine and Surgery: Automated Electro Cardio Graphic Interpretive System (AECGIS) FY 1984-1988 - \$18 million.
- DHHS/HCFA (Health Care Finance Administration): PRISM (Project to Redesign Information System Management) FY 1984-1989 - \$175 million.
- NASA-JPL: Replace Multi-Mission/Multi-Programmatic Image Process Lab FY 1984-1986 - \$2.5 million.
- Energy-Nevada Operations Center: Central Computer Replacement FY 1984 - \$2.6+ million.
- Treasury/IRS: Automated Examination System FY 1984-1988 - \$98 million.
- Treasury/IRS: Check Sorting System FY 1984-1988 - \$5 million.
- EPA: Regional Office Distributed Processing Resources FY 1984-1988 - \$10 million.
- FEMA: Upgraded National Warning System FY 1984-1987 - \$27.7 million.



- Energy/National Magnetic Fusion Energy Computer Center: Class VI/VII Computer System FY 1984-1988 - \$13 million.
- Energy/Los Alamos National Laboratory: Class VI/VII Computer System FY 1984-1985 - \$16.8 million.
- Energy/Livermore National Laboratory: Class VI/VII Computer System FY 1984-1986 - \$18 million.
- Energy/Sandia National Labs: Timeshare System FY 1984-1986 - \$6.8 million.
- Energy/Kansas City: Replace General Purpose Computer System FY 1984-1987 - \$8.6 million.
- Transportation: Integrated Voice/Data System FY 1984-1985 - \$9.2 million.

#### D. SYSTEMS INTEGRATION PROGRAMS - FISCAL YEAR 1985

- AFLC: TRCTOD (Technical Repair Center Technical Order Distribution) FY 1985-1987 - \$19 million.
- NESC: NCCS-SSF (Naval Command Control System-Software Support Facility) FY 1985-1989 - \$50 million.
- NSSC: NICADMM (Navy Integrated Computer Aided Design, Manufacturing and Maintenance) FY 1985-1988 - \$28 million + \$24 million.
- NSSC: Source Data Collection Automation FY 1985-1988 - \$7.5 million.
- NUWES (Naval Undersea Warfare Engineering Station): Replace TRADE (Torpedo Range and Data Evaluation) Central Computer FY 1985-1989 - \$6.3 million.

- NSSC (Naval Supply Systems Command): UADPS (Uniform Automatic Data Processing System) Stock Point Upgrade FY 1985-1990 - estimate \$175 million.
- AFFTC (Air Force Flight Test Center) (Edwards AFB): ARDS (Advanced Range Data System) FY 1985-1988 - \$18.3 million.
- USAF/REDCOM (Readiness Command): JOISTS (Joint Operational Interface Simulation and Training System) FY 1985-1988 - \$8.3 million.
- Interior/U.S. Geological Survey/National Mapping Division: Automated Graphic Output Systems FY 1985-1988 - \$3.5 million.
- Energy/Morgantown Energy Technology Center: Class III Computer System FY 1985 - \$2.7 million.
- Treasury/Bureau of Public Debt: Replace Parkersburg (WV) Computer Center FY 1985-1988 - \$4.5+ million.
- NASA Headquarters: Replace IBM 370/158 System FY 1985-1987 - \$3 million.
- National Science Foundation: Advanced Vector Computer and Mass Storage System FY 1985-1988 - \$13 million.
- U.S. Railroad Retirement Board: Upgrade Central Computer Facility FY 1985 - \$5 million.
- Energy/Naval Reactor Development: Class V Computer Systems FY 1985 - two at \$7.5 million each.
- Energy/Defense Waste and By-Products Management: Scientific Computer System FY 1985 - \$3.4 million.

- Energy/National Magnetic Fusion Energy Computer Center: Large-Scale Scientific Computer System FY 1985-1989 - \$25 million.
- Energy/Uranium Enrichment: Replace Laboratory Computer System FY 1985 - \$4 million.
- Energy/High Energy Physics: Dual Class V Computer System FY 1985-1987 - \$8 million.
- Energy/Basic Energy Sciences: Shared Computer Facility FY 1985-1989 - \$14.5 million.
- Treasury/IRS: Work Program MIS FY 1985-1990 - \$61 million.

#### E. SYSTEMS INTEGRATION PROGRAMS - FISCAL YEAR 1986

- Navy-Naval Oceanographic Office (NAVOCEANO): Primary Processing Center Large-Scale Computer FY 1986-1987 - \$11.5 million plus maintenance.
- Naval Avionics Center (NAVAVIONCEN): Computer Replacement FY 1986-1989 - \$16+ million.
- Interior/Bureau of Mines: Central Computer Procurement FY 1986-1989 - \$6 million.
- U.S. Securities and Exchange Commission: Replace Central Computing Facility FY 1986-1988 - \$2.5 million.
- Energy/National Magnetic Fusion Energy Computer Center: Class VII Computer System FY 1986-1989 - \$12 million.

- Energy/NMFEC: Dynamic Mass Storage System Network FY 1986-1987 - \$4.8 million.
- Energy/NMFEC: Class VII Computer System FY 1986-1988 - \$21 million.
- Energy (NMFC): Class VII Scientific Computer FY 1986-1987 - \$16 million.
- Treasury/IRS: Tax Processing System (redesigned) FY 1986-1990 - estimate \$90+ million.

**F. SYSTEMS INTEGRATION PROGRAMS - FISCAL YEAR 1987**

- Commerce/Bureau of Census: Replace Geographic Support System FY 1987-1988 - \$45 million.
- Commerce/Bureau of Economic Analysis: Replace Central Computer Center FY 1987-1988 - \$4.5 million.
- NASA/Ames Research Center: SIM/RPRV Modernization and Upgrade FY 1987-1988 - \$27.5 million.
- NASA/Langley Research Center: Interactive Processor Replacement-Scientific Computer Center FY 1987-1988 - \$3.5 million.
- Energy/High Energy Physics Lab: New Architecture, Multiple CPU System FY 1987 - \$12 million.





## APPENDIX A: INTERVIEW PROFILE



## APPENDIX A: INTERVIEW PROFILE

### A. FEDERAL AGENCIES

#### I. RESPONDENT PROFILE

<u>Response Type</u>	<u>Policy</u>	<u>Buyers</u>	<u>Users</u>	<u>Total</u>
Telephone Interview	27	5	14	46
Contact Only No Interview	4	12	10	26

- All contacts with agencies were made by telephone.
- Contacts without interviews resulted when contactee indicated that:
  - Agency does not or will not acquire integrated systems or systems integration services.
  - That division, service, or branch did not acquire systems and recommended an alternate contact in agency.
  - Contactee was not informed about agency ADP acquisition policies and procedures.
  - Contactee chose not to be interviewed.



## 2. RESPONDENT DEPARTMENTS AND AGENCIES

- Department of Agriculture.
  - Agricultural stabilization and conservation service.
- Department of Commerce:
  - Information Resource Procurement Division.
  - Bureau of the Census.
  - Bureau of Economic Analysis.
  - International Trade Administration.
  - National Oceanic and Atmospheric Administration.
  - Patent and Trademark Office.
- Department of Defense.
  - Air Force.
    - Air Force Logistics Command.
    - Air Force Systems Command - Electronic Systems Division.

- Army.
  - . Deputy Chief of Staff - Operations.
  - . Computer Systems Selection and Acquisition Agency.
- Navy.
  - . Office of Automation and Communications Systems.
  - . Naval Air Systems Command.
  - . Naval Supply System Command.
  - . Naval Data Automation Command.
- Marine Corps.
  - . Command and Control Information Systems.
- Defense Communications Agency.
- Defense Mapping Agency.
- Defense Nuclear Agency.
- Department of Energy.
  - Office of ADP Management.
  - Lawrence Livermore National Laboratory.
- Department of Health and Human Services.

- Public Health Service.
- Health Care Finance Administration.
- Social Security Administration.
- Department of Interior.
  - Bureau of Land Management.
  - Bureau of Mines.
  - U.S. Geological Survey.
- Department of Justice.
  - Drug Enforcement Agency.
  - Immigration and Naturalization Service.
- Department of Labor.
  - Employment Standards Administration.
  - Employment Training Administration.
- Department of Transportation.
  - Office of the Secretary.
  - Office of Management Systems.

- Federal Aviation Administration.
- U.S. Coast Guard.
- Treasury Department.
  - Bureau of the Public Debt.
  - U.S. Customs Service.
  - Internal Revenue Service.
- Environmental Protection Agency.
  - Office of Information Resource Management.
- Federal Communications Commission.
- Federal Emergency Management Agency.
- General Services Administration.
  - Office of Information Systems.
  - Office of Information Resources Management.
- National Aeronautics and Space Administration.
  - Goddard Space Flight Center.
- United States Postal Service.

### 3. NON-RESPONDENT AGENCIES

- Contacts with the following agencies did not result in complete interviews for a variety of reasons.
- Department of Agriculture.
  - Foreign Agricultural Service.
  - Forest Service.
  - Soil Conservation Service.
- Department of Commerce.
  - National Bureau of Standards.
- Department of Defense.
  - Defense Logistics Agency.
- Department of Education.
- Department of Health and Human Services.
  - Food and Drug Administration.
  - National Institutes of Health.
  - National Library of Medicine.
- Department of Housing and Urban Development.



- Department of Interior.
  - National Park Service.
- Department of Transportation.
  - Federal Highway Administration.
  - Federal Railroad Administration.
  - Maritime Administration.
- Department of Treasury.
  - Bureau of Engraving and Printing.
  - Bureau of the Mint.
  - Bureau of Government Financial Operations.
- Tennessee Valley Authority.
- Veterans Administration.

## B. VENDORS

### 1. RESPONDENT PROFILE

<u>Response Type</u>	<u>Executive</u>	<u>Marketing</u>	<u>Total</u>
Telephone	8	9	17
On-Site	2	1	3
Mail	0	1	1
Total	10	11	21

### 2. RESPONDENT VENDORS

- Intergraph.
- BCS - Federal Systems Group.
- BDM - Information Systems.
- C<sup>3</sup> Inc.
- CDC Eastern Region.
- CSC Systems Group.
- EDS - Information Technology Group.
- Ford Aerospace - Space Management Group.
- Gould.

- Informatics - Information Systems and Services Group.
- McDonald Douglas Technical Services Company.
- Martin-Marietta Data Systems.
- Planning Research Corporation - Government Information Systems Group.
- Raytheon Service Company.
- Rolm - Mil Spec Division.
- SAI - Military Group.
- SASC Systems and Applications.
- Sperry Federal Systems.
- Texas Instruments - Equipment Group.
- TRW - Electronics and Defense Sector.
- VION.

### 3. INCOMPLETE INTERVIEWS

- Contact with an additional 19 systems integration vendors did not produce useful interviews for a variety of reasons.



## APPENDIX B: DEFINITIONS





## APPENDIX B: DEFINITIONS

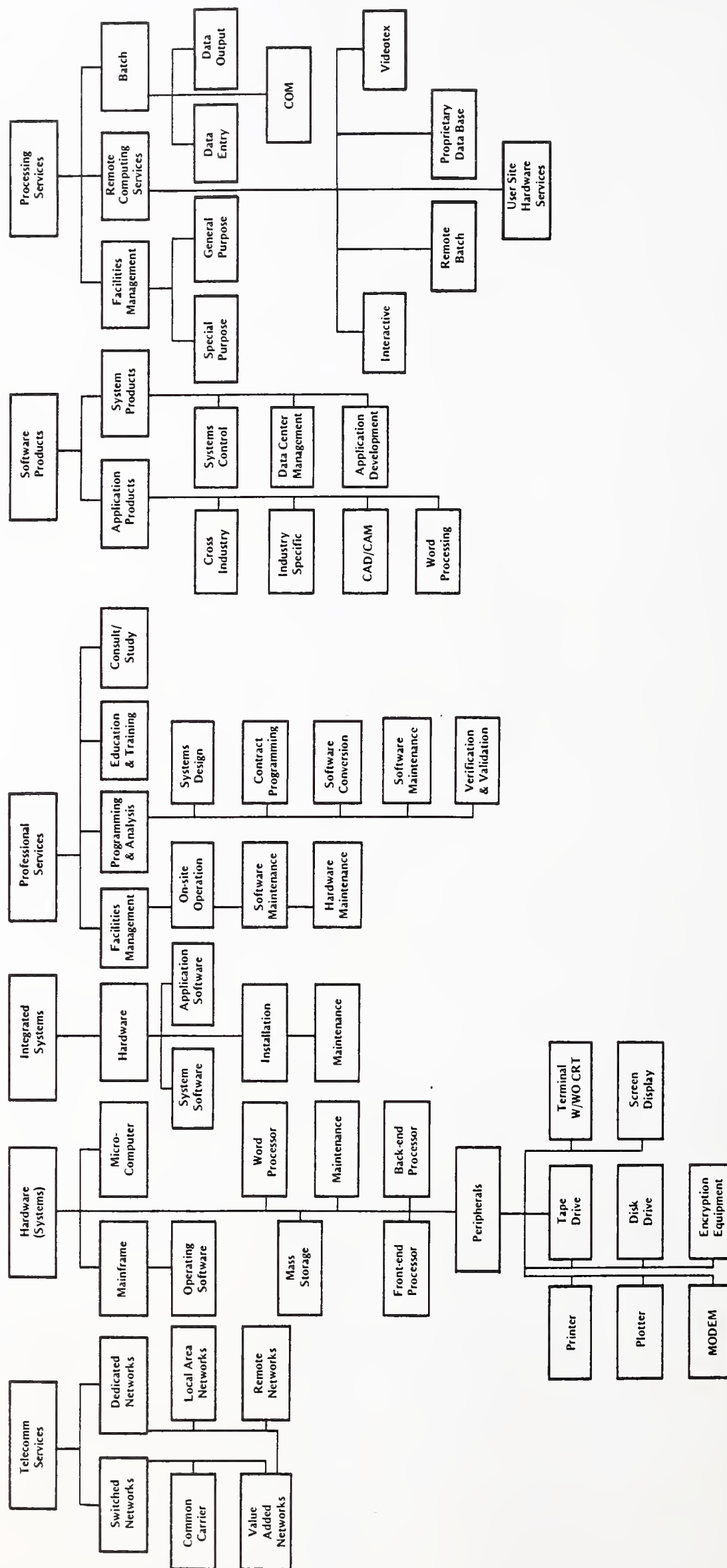
- Systems integration vendors in the federal government market propose on a wider range of systems and services than vendors in commercial markets. To accommodate the range of programs described in the OMB Five-Year Plan and agency long-range information technology plans, the definitions include hardware and telecommunications categories. Additionally, alternate service mode terminology employed by the federal government in its procurement process is defined, along with INPUT's regular terms of reference, as shown in Exhibit B-1.
- The federal government's unique nontechnical terminology that is associated with applications, documentation, budgets, authorization, and the procurement/acquisition process is included in Appendix C: Glossary (Federal Government Acronyms).

### A. SERVICE MODES

- PROCESSING SERVICES - Remote computing services, batch services, and processing facilities management.
  - REMOTE COMPUTING SERVICES (RCS) - Provision of data processing to a user by means of terminals at the user's site(s). Terminals are connected by a data communications network to the vendor's central

# EXHIBIT B-1

## FEDERAL INFORMATION SYSTEMS & SERVICES PROGRAM PROCUREMENT ANALYSIS REPORT SYSTEMS & SERVICES



computer. The most frequent contract vehicle for RCS in the federal government is GSA's TSP (Teleprocessing Services Program). There are five submodes of RCS:

- INTERACTIVE (timesharing) - characterized by the interaction of the user with the system, primarily for problem-solving timesharing, but also for data entry and transaction processing: the user is on-line to the program/files.
- REMOTE BATCH - Where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements.
- PROPRIETARY DATA BASE - Characterized by the retrieval and processing of information from a vendor-maintained data base. The data base may be owned by the vendor or by a third party.
- USER SITE HARDWARE SERVICES (USHS) - These offerings provided by RCS vendors place programmable hardware on the user's site (rather than the EDP center). Some vendors in the federal government market provide this service under the label of Distributed Data Services. USHS offers:
  - Access to a communications network.
  - Access through the network to the RCS vendor's larger computers.
  - Local management (and storage) of a data base subset that will service local terminal users via the connection of a data base processor to the network.
  - Significant software as part of the service.

- BATCH SERVICES - These include data processing performed at vendors' sites for user programs and/or data that are physically transported (as opposed to transported electronically by telecommunications media) to and/or from those sites. Data entry and data output services, such as keypunching and computer output microfilm processing, are also included. Batch services include expenditures by users who take their data to a vendor site that has a terminal connected to a remote computer for the actual processing.
- PROCESSING FACILITIES MANAGEMENT (PFM) (also referred to as "Resource Management," "Systems Management," or "COCO" - contractor-owned / contractor-operated) - The management of all or part of a user's data processing functions under a long-term contract (not less than one year). This would include remote computing and batch services. To qualify as PFM, the contractor must directly plan, control, operate, and own the facility provided to the user, either on-site, through communications lines, or in a mixed mode.
- PROFESSIONAL SERVICES - Made up of services in the following categories:
  - CONSULTING SERVICES - Information systems and/or services management consulting, program assistance (technical and/or management), feasibility analyses, and cost/effectiveness trade-off studies.
  - EDUCATION/TRAINING SERVICES - Products and/or services related to ISS for the user, including CAI (computer-aided instruction), CBE (computer-based education), and vendor instruction of user personnel in operations, programming, and maintenance.
  - OPERATION AND MAINTENANCE (also referred to as O&M) - Contractor (vendor)-staffed support of client ADP/telecommunications equipment on-site (on government property), in cases where the vendor

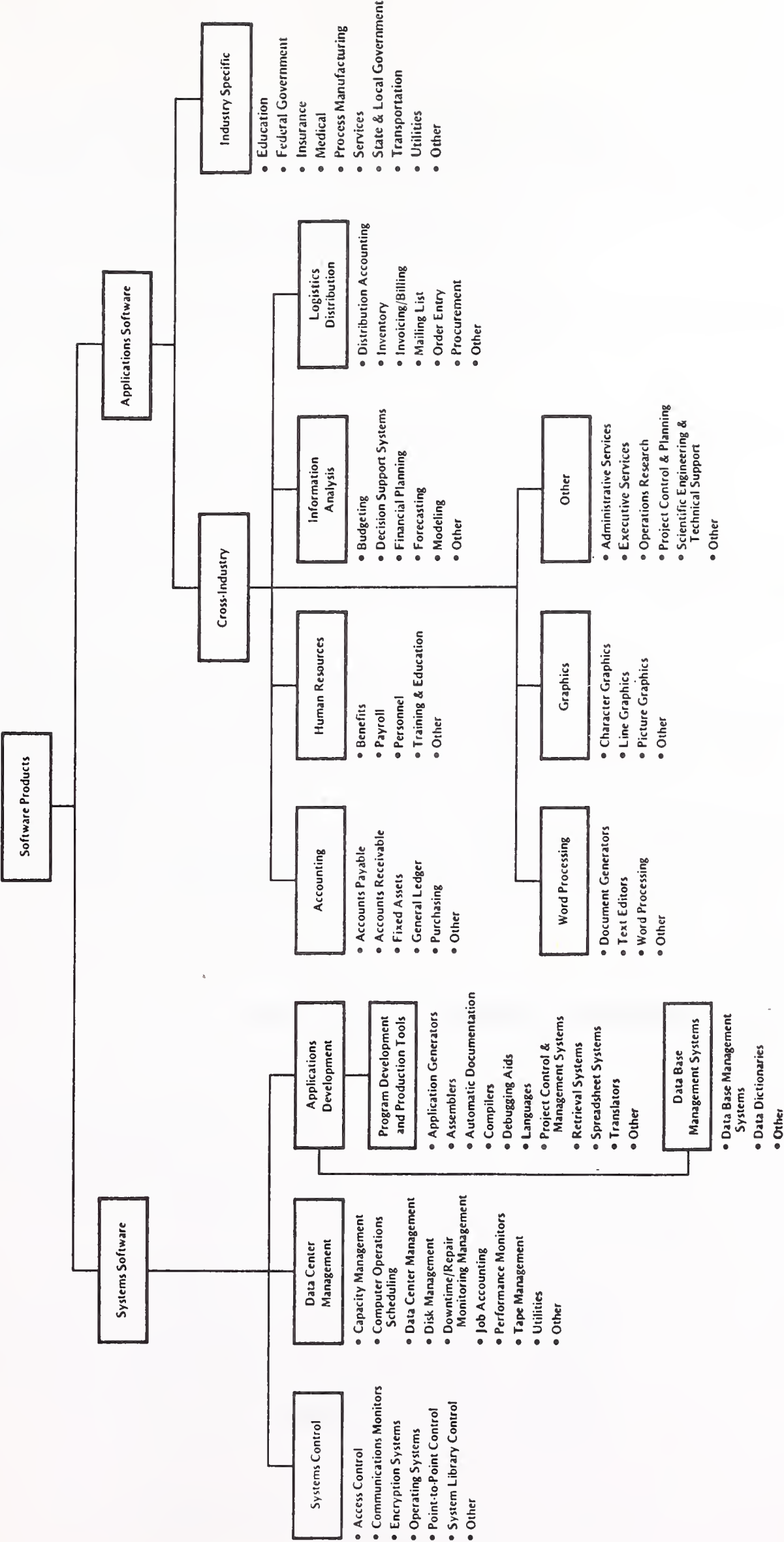


does not manage the complete facility and the equipment and initial software suite may not have been provided by the vendor.

- MAINTENANCE (HARDWARE AND/OR SOFTWARE) - Vendor-furnished services provided after installation and acceptance by the user. These services may be part of a warranty or may be separately contracted; services may be provided by resident or on-call personnel of the vendor.
- PROGRAMMING AND ANALYSIS - Including system design, contract or custom programming, code conversion, independent verification and validation (also called "IV&V"), benchmarking, and software maintenance.
- PROFESSIONAL SERVICES FACILITIES MANAGEMENT (PSFM) (also referred to as GOCO - Government-Owned / Contractor-Operated) - The counterpart to processing facilities management, except that the computers are owned or leased by the government, not the PSFM vendor, and the vendor provides the staff to operate, maintain, and manage the government's facility.
- SYSTEMS INTEGRATION - Services associated with systems design, integration of computing components, installation and government acceptance of ADP/telecommunications systems. System components may be furnished by separate vendors to the government (not as an integrated system by one vendor, called the prime contractor); services may be furnished by a vendor, by a not-for-profit organization, or by another government agency. Integration services may be provided with related engineering activities, such as SE&I (Systems Engineering and Integration) or SETA (Systems Engineering and Technical Assistance).
- THIRD-PARTY MAINTENANCE - Hardware/equipment maintenance sources, usually provided "on call" by a vendor other than the original manufacturer.

- INTEGRATED SYSTEMS (also known as Turnkey Systems) - An integration of systems and applications software, with hardware packaged as a single entity. The value added by the vendor is primarily in the software. Most CAD/CAM systems and many small business systems are integrated systems. This does not include specialized hardware systems such as word processors, cash registers, and process control systems.
- SOFTWARE PRODUCTS - This category includes user purchases of applications and systems packages for in-house computer systems. Included are lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement and maintain the package at the user's sites. Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. There are several subcategories of software products, as indicated below and in detail in Exhibit B-2:
  - APPLICATIONS PRODUCTS - Software that performs processing that services user functions. The products are:
    - CROSS-INDUSTRY PRODUCTS - Used in multiple user industry applications as well as in federal government sectors. Examples are payroll, inventory control, and financial planning.
    - INDUSTRY-SPECIALIZED PRODUCTS - Used in the specific federal government sector, such as planning, resource utilization, aircraft flight planning, military personnel training, etc. May also include some products designed to work in an industry other than the federal government, but applicable to specific government-performed commercial/industrial services, such as hospital information, vehicular fleet scheduling, electric power generation and distribution, CAD/CAM, etc.

SOFTWARE PRODUCTS



- SYSTEMS PRODUCTS - Software that enables the computer/communications system to perform basic functions. They consist of:
  - SYSTEMS CONTROL PRODUCTS - Function during applications program execution to manage the computer system resource. Examples include operating systems, communication monitors, emulators, and spoolers.
  - DATA CENTER MANAGEMENT PRODUCTS - Used by operations personnel to manage the computer system resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, and utilities.
  - APPLICATION DEVELOPMENT PRODUCTS - Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include languages, sorts, productivity aids, compilers, data dictionaries, data base management systems, report writers, project control systems, and retrieval systems.

## **B.     HARDWARE/HARDWARE SYSTEMS**

- HARDWARE - Includes all ADP and telecommunications equipment that can be separately acquired by the government, with or without installation by the vendor, and not acquired as part of a system.
- PERIPHERALS - Includes all input, output, communications, and storage devices, other than main memory, that can be locally connected to the main processor and generally cannot be included in other categories, such as terminals.



- INPUT DEVICES - Includes keyboards, numeric pads, card readers, bar-code readers, lightpens and trackballs, tape readers, position and motion sensors, and A-to-D (analog-to-digital) converters.
- OUTPUT DEVICES - Includes printers, CRTs, projection television screens, microfilm processors, digital graphics, and plotters.
- COMMUNICATION DEVICES - Modems, encryption equipment, special interfaces, and error control.
- STORAGE DEVICES - Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, drums, solid state (integrated circuits), and bubble and optical memories.
- TERMINALS - There are three types of terminals used in federal government systems:
  - USER PROGRAMMABLE (also called "intelligent terminals"):
    - Single-station or standalone.
    - Multistation-shared processor.
    - Teleprinter.
    - Remote batch.
  - USER NONPROGRAMMABLE:
    - Single-station.
    - Multistation-shared processor.
    - Teleprinter.



- LIMITED FUNCTION - Originally developed for specific needs, such as POS (point of sale), inventory data collection, controlled access, etc.
- HARDWARE SYSTEMS - For the purposes of this report, hardware systems include all processors, from microcomputers to super (scientific) computers. Hardware systems require type- or model-unique operating software to be functional, but the category excludes applications software and peripheral devices, other than main memory and processors or CPUs not provided as part of an integrated (turnkey) system.
  - MICROCOMPUTER - Combines all of the CPU, memory, and peripheral functions of an 8- or 16-bit computer on a chip, in the form of:
    - Integrated circuit package.
    - Plug-in board with more memory and peripheral circuits.
    - Console - including keyboard and interfacing connectors.
    - Personal computer with at least one external storage device directly addressable by CPU.
    - An embedded computer, which may take a number of shapes or configurations.
  - MINICOMPUTER - Usually a 12-, 16- or 32-bit computer, which may be provided with limited applications software and support, and may represent a portion of a complete large system.
    - Personal business computer.

- Small laboratory computer.
- Nodal computer in a distributed data network, remote data collection network, connected to remote microcomputers.
- MIDICOMPUTER - Typically a 32- or 64-bit computer, with extensive applications software and a number of peripherals in standalone or multiple CPU configurations for business (administrative, personnel, and logistics) applications, also called a General-Purpose Computer.
- LARGE COMPUTER - Presently centered around storage controllers but likely to become bus-oriented and to consist of multiple processors (CPUs) or parallel processors; they are intended for structured mathematical and signal processing, and are generally used with general-purpose von-Neumann-type processors for system control.
- SUPER COMPUTER - High-powered processors with numerical processing throughput that is significantly greater than the largest general-purpose computers, with capacities in the 10-50 MFLOPS (million floating point operations per second) range, in two categories:
  - REAL TIME - Generally used for signal processing in military applications.
  - NONREAL TIME - For scientific use, with maximum burst-mode (not sustained speed) capacities of up to 100 MFLOPS, in one of three configurations:
    - Parallel processors.
    - Pipeline processor.
    - Vector processor.

- Newer super computers, with burst modes approaching 300 MFLOPS, main storage size up to 10 million words, and on-line storage in the one-to-three gigabyte class, are labelled Class IV to VI in agency long-range plans.
- EMBEDDED COMPUTER - Dedicated computer system designed and implemented as an integral part of a weapon or weapon system, or platform, or is critical to a military or intelligence mission, such as command and control, cryptological activities, or intelligence activities. Characterized by MIL SPEC (military specification) appearance and operation, limited but reprogrammable applications software, and permanent or semipermanent interfaces. May vary in capacity from microcomputers to parallel-processor computer systems.

### C. TELECOMMUNICATIONS

- NETWORKS - Interconnection services between computing resources. Provided on a leased basis by a vendor, to move data and/or textual information from one or more locations to one or more locations.
- COMMON CARRIER NETWORKS (CCN) - Provided via conventional voice-grade circuits and through regular switching facilities (dial-up calling) with leased or user-owned modems (to convert digital information to voice-grade tones) for transfer rates between 150 and 1,200 baud.
- VALUE-ADDED NETWORKS (VAN) - Provided by vendors through common carrier or special-purpose transmission facilities, with special features not available in the voice-grade switched public network:

- DEDICATED NETWORK - Provides nonswitched interconnections between computing resources, such as:
  - Full-period, continuously connected communications interface, with machine-to-machine traffic flow.
  - Message-switched text/data flow between specified CPUs or terminals, as determined by information included in the header (front-end) of the message or data block.
- PACKET-SWITCHED - Provides means for delivery of pre-determined blocks of data/text through a common-carrier-type switched network.
- MESSAGE-SWITCHED - Similar to the dedicated network in message delivery methods, but not restricted to a single user.
- LOCAL-AREA NETWORK (LAN) - Restricted limited-access network between computing resources in a relatively small (but not necessarily contiguous) area, such as a building, complex of buildings, or buildings distributed within a metropolitan area. One of two types:
  - BASEBAND - Voice bandwidth at voice frequencies (same as telephone, teletype system), limited to a single sender at any given moment and limited to speeds of 75 to 1,200 baud, in serial mode.
  - BROADBAND - Employs multiplexing techniques to increase carrier frequency between terminals, to provide:
    - Multiple (simultaneous) channels via FDM (Frequency Division Multiplexing).



- Multiple (time-sequenced) channels via TDM (Time Division Multiplexing).
- High-speed data transfer rate via parallel mode at rates of up to 96,000 baud (or higher, depending on media).
- TRANSMISSION MEDIA - Varies with the supplier (vendor) and with the distribution of the network and its access mode to the individual computing resource location.
  - MODE - may be either:
    - ANALOG - Typified by the predominantly voice-grade network of AT&T's DDD (Direct Distance Dialing) and by operating telephone company distribution systems.
    - DIGITAL - Where voice, data, and/or text are digitized into a binary stream.
  - MEDIA varies with distance, availability, and connectivity:
    - WIRE - Varies from earlier single-line teletype networks, to two-wire standard telephone (twisted pair) and balanced line, to four-wire full-duplex balanced lines.
    - CARRIER - Multiplexed signals on two-wire and four-wire networks to increase capacity by FDM.
    - COAXIAL CABLE - HF (High Frequency) and VHF (Very High Frequency), single frequency, or carrier-based system that requires frequent reamplification (repeaters) to carry the signal any distance.



- MICROWAVE - UHF (Ultra High Frequency) multichannel, point-to-point, repeated radio transmission, also capable of wide frequency channels.
- OPTICAL FIBER - Local signal distribution systems employed in limited areas, using light-transmitting glass fibers, and using TDM for multichannel applications.
- SATELLITES - Synchronous earth-orbiting systems that provide point-to-point, two-way service over significant distances without intermediate amplification (repeaters), but requiring suitable groundstation facilities for up- and down-link operation.
- CELLULAR RADIO - Network of fixed, low-powered two-way radios that are linked by a computer system to track mobile phone/data set units; each radio serves a small area called a cell. The computer switches service connection to the mobile unit from cell to cell as the unit moves among the cells.

#### D. GENERAL DEFINITIONS

- BENCHMARK - Method of testing proposed ADP system solutions for a specified set of functions (applications) employing simulated or real data inputs under simulated operating conditions.
- BYTE - Approximately equivalent to the storage required for one alphanumeric character (i.e., one letter or number).
- CENTRAL PROCESSING UNIT (CPU) - The arithmetic and control portion of a computer, i.e., the circuits controlling the interpretation and execution of computer instructions.

- CONSTANT DOLLARS - Growth forecasts in constant dollars make no allowance for inflation or recession. Dollar value based on the year of the forecast unless otherwise indicated.
- COMPUTER SYSTEM - The combination of computing resources required to perform the designed functions, and which may include one or more CPUs, machine room peripherals, storage systems, and/or applications software.
- CONUS - Locations within the geographical limits of the CONTinental United States.
- CURRENT DOLLARS - Estimates or values expressed in current-year dollars, which, for forecasts, would include allowance for inflation.
- DATA ENCRYPTION STANDARD (DES) - A specified encryption algorithm implemented by hardware design and used to protect data when stored in or transmitted between user locations.
- DISTRIBUTED DATA PROCESSING - Distributed processing is the deployment of programmable intelligence in order to perform a data processing function where it can be accomplished most effectively, through computers and terminals arranged in a telecommunications network adapted to the user's characteristics.
- EMBEDDED COMPUTER - Computer system that is an integral part of a weapon, weapon system, or platform, or is critical to the direct fulfillment of a military or intelligence mission.
- ENCRYPTION - Electrical, code-based conversion of transmitted data, to provide security and/or privacy of data between authorized access points.

- END USER - One who is using a product or service to accomplish his/her own functions. The end user may buy a system from the hardware supplier(s) and do his/her own programming, interfacing, and installation. Alternately, the end user may buy a turnkey system from a systems house or hardware integrator, or may buy a service from an in-house department or external vendor.
- ENGINEERING CHANGE NOTICE (ECN) - Product changes to improve the product after it has been released to production.
- ENGINEERING CHANGE ORDER (ECO) The follow-up to ECNs. They include parts and a bill of material to effect the change in hardware.
- EQUIPMENT OPERATORS - Individuals operating computer control consoles and/or peripheral equipment (BLS definition).
- FIELD ENGINEER (FE) - Field engineer, customer engineer, servicemen, and maintenance men are used interchangeably and refer to the individual who responds to a user's service call to repair a device or system.
- GENERAL-PURPOSE COMPUTER SYSTEM - A computer designed to handle a wide variety of problems; includes machine room peripherals, systems software, and small business systems.
- HARDWARE INTEGRATOR - Develops system interface electronics and controllers for the CPU, sensors, peripherals, and all other ancillary hardware components. The hardware integrator may also develop control system software, in addition to installing the entire system at the end-user site.
- INDEPENDENT SUPPLIERS - Suppliers of machine room peripherals; usually do not supply general-purpose computer systems.
- INFORMATION PROCESSING - Data processing as a whole, including use of business and scientific computers.

- INSTALLED BASE - Cumulative number or value (cost when new) of computers in use.
- KEYPUNCH OPERATORS - Individuals operating keypunch machines (similar in operation to electric typewriters) to transcribe data from source material onto punch cards.
- MACHINE REPAIRERS - Individuals who install and periodically service computer systems.
- MACHINE ROOM PERIPHERALS - Peripheral equipment that is generally located close to the central processing unit.
- MAINFRAME - The central processing unit (CPU, or units in a parallel processor) of a computer that interprets and executes computer (software) instructions.
- MEAN TIME TO REPAIR - The mean of the elapsed times from the arrival of the field engineer on the user's site until the device is repaired and returned to the user.
- MEAN TIME TO RESPOND - The mean of elapsed times between when the user calls for service and when the field engineer arrives at the user's location.
- MESSAGE - A communication intended to be read by a person. The quality of the received document does not have to be high, only readable; graphic materials are not included.
- MODEM - A device that encodes information into electronically transmittable form (MODulator) and restores it to original form (DEModulator).



- NETWORK - Electronic interconnection between a central computer site and remote locations; it may incorporate switching and/or regional data processing nodes.
- NODE - Connection point of three or more independent transmission points, which may provide switching or data collection.
- OFF-LINE - Pertaining to equipment or devices that can function without direct control of the central processing unit.
- ON-LINE - Pertaining to equipment or devices under direct control of the central processing unit.
- OVERSEAS - Not within the geographical limits of the continental United States, Alaska, Hawaii, and U.S. possessions.
- PERIPHERALS - Any unit of input/output equipment in a computer system, exclusive of the central processing unit.
- PROGRAMMERS - Persons mainly involved in designing, writing, and testing of computer software programs.
- PROTOCOLS - Digitally encoded instructions for computer-controlled digital switches in digital (data/text) networks that define treatment and identify sender and receiver.
- SCIENTIFIC COMPUTER SYSTEM - A computer system designed to process structured mathematics, such as Fast Fourier Transforms and complex, highly redundant information, such as seismic data, sonar data, and radar, with large on-line memories and very high capacity throughput.
- SECURITY - Physical, electrical, and computer (digital) coding procedures to protect the contents of computer files and data transmission from inadvertent



or unauthorized disclosure, to meet the requirements of the Privacy Act and national classified information regulations.

- SOFTWARE - Computer programs.
- SUPPLIES - Includes materials associated with the use or operation of computer systems, such as print-out paper, keypunch cards, diskette packs, etc.
- SYSTEMS ANALYST - Individual who analyzes problems to be converted to a programmable form for application to computer systems.
- SYSTEMS HOUSE - Vendor that acquires, assembles, and integrates hardware and software into a total turnkey system to satisfy the data processing requirements of the end user. The vendor may also develop system software products for license to end users. The systems house vendor does not manufacture mainframes.
- SYSTEMS INTEGRATOR - Systems house vendor that develops systems interface electronics, application software, and controllers for the CPU, peripherals, and ancillary subsystems, that may have been provided by a contractor or the government (GFE). This vendor may either supervise or perform the installation and acceptance testing of the completed system.
- TURNKEY SYSTEM - System composed of hardware and software integrated into a total system designed to completely fulfill the processing requirements of a single application.
- VERIFICATION AND VALIDATION - Process for examining and testing applications (and special systems) software, to verify that it operates on the target CPU and performs all of the functions specified by the user.

## E. OTHER CONSIDERATIONS

- When questions arise as to the proper place to count certain user expenditures, INPUT addresses the questions from the user viewpoint. Expenditures are then categorized according to what the users perceive they are buying.



## APPENDIX C: GLOSSARY OF FEDERAL ACRONYMS





## APPENDIX C: GLOSSARY OF FEDERAL ACRONYMS

- The federal government's procurement language uses a combination of acronyms, phrases, and words that is further complicated by different agency definitions. Terms of accounting, business, economics, engineering, and law are further complicated by new applications and technology.
- Acronyms and contract terms that INPUT encountered most often in program documentation and interviews for this report are included here, but this glossary should not be considered all inclusive. Federal procurement regulations (DAR, FPR, FAR, FIRMR, FPMR) and contract terms listed in RFIs, RFPs, and RFQs provide applicable terms and definitions.

### A. ACRONYMS

- |   |       |  |
|---|-------|--|
| ● | AAS   | Automatic Addressing System.   |
| ● | AATMS | Advanced Air Traffic Management System.  |
| ● | ACO   | Administrative Contracting Offices (DCAS).                                     |
| ● | ACS   | Advanced Communications Satellite (formerly NASA 30/20 GHz Satellite Program). |
| ● | ACT-I | Advanced Computer Techniques (Air Force).                                      |
| ● | Ada   | DoD High-Order Language.   |
| ● | ADA   | Airborne Data Acquisition.   |
| ● | ADL   | Authorized Data List.  |

- ADP Automatic Data Processing.
- ADPE Automatic Data Processing Equipment.
- ADS Automatic Digital Switches (DCS).
- AGE Aerospace Ground Equipment.
- AIP Array Information Processing.
- AMPE Automated Message Processing Equipment.
- AMPS Automated Message Processing System.
- AMSL Acquisition Management Systems List.
- ANSI American National Standards Institute.
- AP(P) Advance Procurement Plan.
- Appropriation Congressionally approved funding for authorized programs and activities of the Executive Branch.
- APR Agency Procurement Request.
- ARPANET DARPA Network of interconnected scientific computers.
- ATLAS Abbreviated Test Language for All Systems (for ATE-Automatic Test Equipment).
- Authorization In legislative process: programs, staffing, and other routine activities must be approved by Oversight Committees before the Appropriations Committee will approve the money from the budget.
- AUTODIN AUTOMATIC Digital Network (of the Defense Communications System).
- BA Basic Agreement.
- BAFO Best And Final Offer.
- Base level Procurement, purchasing, and contracting at the military installation level.
- BCA Board of Contract Appeals.
- Benchmark Method of evaluating ability of a candidate computer system to meet user requirements.
- Bid protest Objection (in writing, before or after contract award) to some aspect of a solicitation by a valid bidder.

- BML Bidders Mailing List - qualified vendor information filed annually with federal agencies to automatically receive RFPs and RFQs in areas of claimed competence.
- BOA Basic Ordering Agreement.
- B&P Bid and Proposal - vendor activities in response to government solicitation/specific overhead allowance.
- BPA Blanked Purchase Agreement.
- BPE Best Preliminary Estimate.
- Budget Federal Budget, proposed by the President and subject to Congressional review.
- C<sup>2</sup> Command and Control.
- C<sup>3</sup> Command, Control, and Communications.
- C<sup>4</sup> Command, Control, Communications, and Computers.
- C<sup>3</sup>I Command, Control, Communications, and Intelligence.
- CAB Contract Adjustment Board, or Contract Appeals Board.
- CAD Computer-Aided Design.
- CADE Computer-Aided Design and Engineering.
- CADS Computer-Assisted Display Systems.
- CAIS Computer-Assisted Instruction System.
- CAM Computer-Aided Manufacturing.
- CAPS Command Automation Procurement Systems.
- CAS Contract Administration Services, or Cost Accounting Standards.
- CASB Cost Accounting Standards Board.
- CASP Computer-Assisted Search Planning.
- CBD Commerce Business Daily - publication of the U.S. Department of Commerce listing government contract opportunities and awards.
- CBEMA Computer and Business Equipment Manufacturers Association.
- CBO Congressional Budget Office.
- CCDR Contractor Cost Data Reporting.

●	CCN	Contract Change Notice.
●	CCPDS	Command Center Processing and Display Systems.
●	CCPO	Central Civilian Personnel Office.
●	CCTC	Command and Control Technical Center (JCS).
●	CDR	Critical Design Review.
●	CDRL	Contractor Data Requirements List.
●	CFE	Contractor-Furnished Equipment.
●	CFR	Code of Federal Regulations.
●	CIG	Computerized Interactive Graphics.
●	CIR	Cost Information Reports.
●	CM	Configuration Management.
●	CMI	Computer-Managed Instruction.
●	CNI	Communications, Navigation, Identification.
●	CO	Contracting Office, Contract Offices, or Change Order.
●	COB	Command Operating Budget.
●	COBOL	COmmon Business Oriented Language.
●	COC	Certificate of Competency (administered by Small Business Administration).
●	COCO	Contractor-Owned, Contractor-Operated.
●	CODSIA	Council of Defense and Space Industry Associations.
●	CONUS	CONtinental United States.
●	COP	Capability Objectives Package.
●	COTR	Contracting Officer's Technical Representative.
●	CP	Communications Processor.
●	CPAF	Cost-Plus-Award-Fee Contract.
●	CPFF	Cost-Plus-Fixed-Fee Contract.
●	CPIF	Cost-Plus-Incentive-Fee Contract.
●	CPR	Cost Performance Reports.
●	CPSR	Contractor Procurement System Review.
●	CPU	Central Processor Unit.
●	CR	Cost Reimbursement (Cost Plus Contracts).
●	CSA	Combat or Computer Systems Architecture.



- C/SCSC Cost/Schedule Control System Criteria (also called "C"-Spec).
- CWAS Contractor Weighted Average Share in Cost Risk.
- DAL Data Accession List.
- DAR Defense Acquisition Regulations.
- DARPA Defense Advanced Research Projects Agency.
- DAS Data Acquisition System.
- DBHS Data Base Handling Systems.
- DBMS Data Base Management System.
- DCA Defense Communications Agency.
- DCAA Defense Contract Audit Agency.
- DCAS Defense Contract Administrative Services.
- DCASR DCAS Region.
- DCC Digital Control Computer.
- DCP Development Concept Paper (DoD).
- DCS Defense Communications System.
- DDA Dynamic Demand Assessment (Delta Modulation).
- DDC Defense Documentation Center.
- DDL Digital Data Link.
- DDN Digital Data Network.
- DDS Dynamic Diagnostics System.
- D&F Determination and Findings - required documentation for approval of a negotiated procurement.
- DIDS Defense Integrated Data Systems.
- DISC Defense Industrial Supply Center.
- DO Delivery Order.
- DPA Delegation of Procurement Authority (granted by GSA under FPRs).
- DPC Defense Procurement Circular.
- DQ Definite Quantity Contract.
- DQ/PL Definite Quantity Price List Contract.
- DR Deficiency Report.



- DSN Defense Switched Network.
- DSP Defense Support Program (WWMCCS).
- DTC Design-to-Cost.
  
- ECP Engineering Change Proposal.
- EEO Equal Employment Opportunity.
- EIA Electronic Industries Association.
- 8(a) Set-Aside Agency awards direct to Small Business Administration for direct placement with a socially/economically disadvantaged company.
  
- EMC Electro Magnetic Compatibility.
- EMCS Energy Monitoring and Control System.
- EO Executive Order - Order ISS by the President.
- EOQ Economic Ordering Quantity.
- EPA Economic Price Adjustment.
- EPMR Estimated Peak Monthly Requirement.
- EPS Emergency Procurement Service (GSA), or Emergency Power System.
  
- FA Formal Advertising.
- FAC Facility Contract.
- FAR Federal Acquisition Regulations.
- FCA Functional Configuration Audit.
- FCDC Federal Contract Data Center.
- FCRC Federal Contract Research Center.
- FDPC Federal Data Processing Centers.
- FEDSIM Federal (Computer) Simulation Center (GSA).
- FFP Firm Fixed-Price Contract (also Lump Sum Contract).
- FIPS-PUBS Federal Information Processing Standards Publications.
- FIRMR Federal Information Resource Management Regulations
- FMS Foreign Military Sales.
- FOC Final Operating Capability.
- FOIA Freedom of Information Act.

- FP Fixed-Price Contract.
  - FP-L/H Fixed-Price - Labor/Hour Contract.
  - FP-LOE Fixed-Price - Level-of-Effort Contract.
  - FPMR Federal Property Management Regulations.
  - FPR Federal Procurement Regulations.
  - FSC Federal Supply Classification.
  - FSG Federal Supply Group.
  - FSN Federal Stock Number.
  - FSS Federal Supply Schedule, or Federal Supply Service (GSA).
  - FTS Federal Telecommunications System
  - FY Fiscal Year.
  - FYDP Five-Year Defense Plan.
- 
- GAO General Accounting Office.
  - GFE Government-Furnished Equipment.
  - GFM Government-Furnished Material.
  - GFY Government Fiscal Year (October to September).
  - GIDEP Government-Industry Data Exchange Program.
  - GOCO Government Owned - Contractor Operated.
  - GOGO Government Owned - Government Operated.
  - GPO Government Printing Office.
  - GPS Global Positioning System.
  - GS General Schedule.
  - GSA General Services Administration.
- 
- HPA Head of Procuring Activity.
  - HSDP High-Speed Data Processors.
- 
- ICA Independent Cost Analysis.
  - ICAM Integrated Computer-Aided Manufacturing.
  - ICE Independent Cost Estimate.
  - ICP Inventory Control Point.

- ICST Institute for Computer Sciences and Technology, National Bureau of Standards, Department of Commerce.
- IDAMS Image Display And Manipulation System.
- IDEP Interservice Data Exchange Program.
- IDN Integrated Data Network.
- IFB Invitation For Bids.
- IOC Initial Operating Capability.
- IOI Internal Operating Instructions.
- IQ Indefinite Quantity contract.
- IR&D Independent Research & Development.
- IRM Information Resource Manager.
- IXS Information Exchange System.
  
- JOCIT JOVIAL Compiler Implementation Tool.
- JSIPS Joint Systems Integration Planning Staff.
- JSOP Joint Strategic Objectives Plan.
- JSOR Joint Service Operational Requirement.
- JUMPS Joint Uniform Military Pay System.
  
- LC Letter Contract.
- LCC Life Cycle Costing.
- LCMP Life Cycle Management Procedures (DD7920.1).
- LCMS Life Cycle Management System.
- L-H Labor-Hour Contract.
- LOI Letters Of Interest
- LRPE Long-Range Procurement Estimate.
- LSI Large-Scale Integration.
  
- MAISRC Major Automated Information Systems Review Council.
- MANTECH MANufacturing TECHnology.
- MAPS Multiple Address Processing System.
- MASC Multiple Award Schedule Contract
- MDA Multiplexed Data Accumulator.

- MENS Mission Element Need Statement, or Mission Essential Need Statement (see DD-5000.I Major Systems Acquisition).
  - MILSCAP Military Standard Contract Administration Procedures.
  - MIL SPEC Military Specification.
  - MIL STD Military Standard.
  - MIPR Military Interdepartmental Purchase Request.
  - MOD Modification.
  - MOL Maximum Ordering Limit (Federal Supply Service).
  - MPC Military Procurement Code.
  - MYP Multi-Year Procurement.
- 
- NARDIC Navy Research and Development Information Center.
  - NCMA National Contract Management Association.
  - NICRAD Navy-Industry Cooperative Research and Development.
  - NIP Notice of Intent to Purchase.
  - NMCS National Military Command System.
  - NSIA National Security Industrial Association.
  - NTIS National Technical Information Services.
- 
- Obligation "Earmarking" of specific funding for a contract, from committed agency funds.
  - OCS Office of Contract Settlement.
  - OFCC Office of Federal Contract Compliance.
  - Off-Site Services to be provided near, but not on/in government facility.
  - OFMP Office of Federal Management Policy (GSA).
  - OFPP Office of Federal Procurement Policy.
  - OIRM Office of Information Resources Management.
  - O&M Operations & Maintenance.
  - OMB Office of Management and Budget.
  - O,M&R Operations, Maintenance & Repair.
  - On-Site Services (nonpersonal) to be performed on a government installation (or in a specified building).



- OPM Office of Procurement Management (GSA).
- Options Sole-source additions to the base contract, for services or goods, to be exercised at the government's discretion.
- OSHA Occupational Safety and Health Act.
- OSP Offshore Procurement.
- OTA Office of Technology Assessment (Congress).
- Out-Year Proposed funding for fiscal years beyond the Budget Year (next fiscal year).
- P-I FY Defense Production Budget.
- P<sup>3</sup>I Pre-Planned Product Improvement (program in DoD).
- PAR Procurement Authorization Request, or Procurement Action Report.
- PAS Pre-Award Survey.
- PASS Procurement Automated Source System.
- PCM Pulse Code Modulation.
- PCO Procurement Contracting Officer.
- PDA Principal Development Agency.
- PDM Program Decision Memorandum.
- PDR Preliminary Design Review.
- PIR Procurement Information Reporting.
- PME Performance Monitoring Equipment.
- PMP Program Management Plan.
- PO Purchase Order, or Program Office.
- POM Program Objective Memorandum.
- PPBS Planning, Programming, Budgeting System.
- PPM Pulse Position Modulation.
- PR Purchase Request, or Procurement Requisition.
- PROM Programmable Read-Only Modules.
- PS Performance Specification - alternative to a Statement of Work, when work to be performed can be clearly specified.



- QA Quality Assurance.
  - QAO Quality Assurance Office.
  - QMCS Quality Monitoring and Control System (DoD Software).
  - QMR Qualitative Material Requirement (Army).
  - QPL Qualified Products List.
  - QRC Quick Reaction Capability.
  - QRI Quick Reaction Inquiry.
- 
- R-I FY RDT&E Budget.
  - RAM Reliability, Availability, and Maintainability.
  - RC Requirements Contract.
  - R&D Research & Development.
  - RDA Research, Development, and Acquisition.
  - RDD Required Delivery Date.
  - RD&E Research, Development, and Engineering.
  - RDF Rapid Deployment Force.
  - RDT&E Research, Development, Test, & Engineering.
  - RFI Request For Information.
  - RFP Request For Proposal.
  - RFQ Request For Quotation.
  - RFTP Request For Technical Proposals (Two-Step).
  - ROC Required Operational Capability.
  - ROI Return On Investment.
  - RTAS Real-Time Analysis System.
  - RTDS Real-Time Display System.
- 
- SA Supplemental Agreement.
  - SBA Small Business Administration.
  - SB Set-Aside Small Business Set-Aside contract opportunities with bidders limited to certified small businesses.
  - SCA Service Contract Act (1964 as amended).
  - SCN Specification Change Notice.
  - SE&I Systems Engineering and Integration.

- SETA Systems Engineering/Technical Assistance.
  - SETS Systems Engineering/Technical Support.
  - SIBAC Simplified Intragovernmental Billing and Collection System.
  - SIMP Systems Integration Master Plan.
  - SIOP Single Integrated Operations Plan.
  - SNAP Shipboard Nontactical ADP Program.
  - Sole Source Contract award without competition.
  - Solicitation Invitation to (submit a) bid.
  - SOR Specific Operational Requirement.
  - SOW Statement of Work (negotiated procurements).
  - SSA Source Selection Authority (DoD).
  - SSAC Source Selection Advisory Council.
  - SSEB Source Selection Evaluation Board.
  - SSO Source Selection Official (NASA).
  - STINFO Scientific and Technical INFOrmation Program - Air Force/NASA.
  - SWO Stop-Work Order.
  - Synopsis Brief description of contract opportunity in CBD, after D&F and before release of solicitation.
- 
- TA/AS Technical Assistance/Analyst Services.
  - TDMA Time Division Multiple Access.
  - TEMPEST DoD techniques to inhibit unintentional electromagnetic radiation.
  - TILO Qualified Requirements Information Program - Army.
  - TM Time and Materials contract.
  - TOA Total Obligational Authority (Defense).
  - TOD Technical Objective Document.
  - TR Temporary Regulation (added to FPR, FAR).
  - TRACE Total Risk Assessing Cost Estimate.
  - TRCO Technical Representative of the Contracting Offices.
  - TRP Technical Resources Plan.
  - TSP Teleprocessing Services Program (GSA).

- UCAS Uniform Cost Accounting System.
- UPS Uninterruptable Power Source.
- U.S.C. United States Code.
  
- VE Value Engineering.
- VHSIC Very High Speed Integrated Circuits.
- VIABLE Vertical Installation Automation BaseLine (Army).
- VICI Voice Input Code Identifier.
- VLSI Very Large Scale Integration.
  
- WBS Work Breakdown Structure.
- WGM Weighted Guidelines Method.
- WIN WWMCCS Intercomputer Network.
- WIS WWMCCS Information Systems.
- WS Work Statement - Offerer's description of the work to be done (proposal or contract).
- WWMCCS WorldWide Military Command and Control System.

## **B. OMB CIRCULARS**

- A-11 Preparation and Submission of Budget Estimates.
- A-49 Use of Management and Operating Contracts.
- A-71 Responsibilities for the Administration and Management of Automatic Data Processing Activities.
- A-76 Policies for Acquiring Commercial or Industrial Products and Services Needed by the Government.
- A-109 Major Systems Acquisitions.
- A-120 Guidelines for the Use of Consulting Services.
- A-121 Cost Accounting, Cost Recovery, and Integrated Sharing of Data Processing Facilities.

### C. DEPARTMENT OF DEFENSE DIRECTIVES

- DD-5000.1 Major System Acquisitions.
- DD-5000.2 Major System Acquisition Process.
- DD-5200.1 DoD Information Security Program.
- DD-5000.31 Interim List of DoD-Approved High-Order Languages.
- DD-5000.35 Defense Acquisition Regulatory Systems.
- DD-7920.1 Life Cycle Management of Automated Information (AIS).
- DD-7920.2 Major Automated Information Systems Approval Process.

## APPENDIX D: RELATED INPUT REPORTS





## APPENDIX D: RELATED INPUT REPORTS

### A. ANNUAL REPORTS

	<u>Year</u>
● U.S. Information Services Markets, 1983-1988 Volume I - Industry-Specific Markets	1983
● U.S. Information Services Markets, 1982-1987 Volume I - Processing Services and Integrated Systems	1982

### B. INDUSTRY SURVEYS

● Seventeenth Annual ADAPSO Survey of the Computer Services Industry	1983
● Sixteenth Annual ADAPSO Survey of the Computer Services Industry	1982
● Directory of Leading U.S. Information Services Vendors	1983

## C. MARKET REPORTS

- Management, Technology, and Strategy for Large Systems 1983
- End-User Experiences with Fourth-Generation Languages 1983
- Large System Vendor Competitive Analysis 1983
- Relational Data Base Management Developments 1983
- Software Productivity Tools: Update and Outlook 1983
- Impact of Upcoming Optical Memory Systems 1983
- Trends in Processing Services and Integrated Systems Pricing 1983
- New Directions in Operating Systems, Communications, and DBMS 1982
- Market Opportunities in Network Services 1982
- The Merging of Hardware, Software, and Services 1981
- Market Trends in Professional Services 1981
- Information Services in 1990 - Management Brief 1981
- Procurement Analysis Reports, 1984-1988 1984

## APPENDIX E: QUESTIONNAIRES





CONFIDENTIAL (AGENCY)

INPUT QUESTIONNAIRE

CATALOG NO. 

F	I	S	S	P	-	2
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STUDY TITLE: Systems Integration Report

STUDY CODE 

G	-	S	I	R
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TYPE OF INTERVIEW: ☐ BUYER ☐ TELEPHONE  
☐ USER ☐ ON-SITE  
☐ POLICY ☐ MAIL

DATE 

M	M	D	D	Y	Y

INTERVIEWER: \_\_\_\_\_

DEPARTMENT: \_\_\_\_\_

AGENCY: \_\_\_\_\_

BRANCH/

OFFICE: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

OPER. TYPE: \_\_\_\_\_

OFFICE CODE: \_\_\_\_\_

FUNCTION: \_\_\_\_\_

NAME	TITLE	TELEPHONE NO.
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SUMMARY

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\_\_\_\_\_

\_\_\_\_\_

REFERENCES

\_\_\_\_\_

\_\_\_\_\_

Good morning/afternoon, my name is \_\_\_\_\_, and I am calling you on behalf of INPUT, an information systems and services research firm.

We are conducting a survey of Systems Integration trends in the federal government marketplace.

The purpose of our study is to assist our U. S. industrial clients in planning to satisfy future federal government needs for computer-based information systems and services.

I would like to ask you a few questions regarding your agency's plan for acquiring Integrated Systems and/or Systems Integration Services over the next five years, if you have the time now.

In return for participating in this study, we will send you a free summary of the research results for your information.

If it is convenient, I'd like to ask you those questions now.

1. (If not convenient) When would be a more convenient time?

\_\_\_\_\_ (date) \_\_\_\_\_ (time)

2. (If uncooperative) Could you give me the name and phone number of someone who might be able to help us? \_\_\_\_\_ (name)

\_\_\_\_\_ (title) \_\_\_\_\_ (phone)

3. (If yes) Call time: \_\_\_\_\_

3a. Name of Agency: \_\_\_\_\_

Agency Code: \_\_\_\_\_

3b. Interviewee: \_\_\_\_\_

Title: \_\_\_\_\_

(If yes Continue)

1) Does your agency plan to expand, upgrade, or replace any of its current computer systems in the next five years? ☐ Yes ☐ No

(If NO, go to 3)

(If YES):

a. How many will be expanded? \_\_\_\_\_

\_\_\_\_\_

b. How many will be upgraded? \_\_\_\_\_

\_\_\_\_\_

c. How many will be replaced? \_\_\_\_\_

\_\_\_\_\_

d. What applications will be changed with these systems?

_____	_____
_____	_____
_____	_____
_____	_____

2) Does your agency plan to add new in-house computers in the next five years? ☐ Yes ☐ No ☐ Don't Know

(If NO, go to 4)

a. What kind of computers/systems will be added?

_____	_____
_____	_____
_____	_____
_____	_____

b. What applications will be supported by these new computers/systems?

_____	_____
_____	_____

(If DON'T KNOW):

c. Who could tell us what kind of systems and applications are being considered?

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Telephone: \_\_\_\_\_

3. Does your agency currently use outside computing resources or services to satisfy information processing requirements?

☐ Yes

☐ No

(If NO, go to 5)

(If YES):

a. Why does your agency use outside services?

_____	_____
_____	_____
_____	_____

b. What applications are supported by outside services?

_____	_____
_____	_____
_____	_____

c. What outside services does your agency use? (Check all that apply)

☐ Other Agency Data Centers

☐ Remote Computing Service

☐ Dedicated COCO

d. Does your agency plan to convert any of these services or applications to in-house services?

☐ Yes

☐ No

(If NO, go to 4)

(If YES):

(1) Which Services?

_____	_____
_____	_____
_____	_____

(2) Which Applications?

_____	_____
_____	_____
_____	_____
_____	_____

(3) Why?

_____
_____



4. (If the answer to 1, 2, and/or 3 was YES):

How does your agency plan to accomplish the change and/or addition of computer systems?

- ☐ Buy integrated (turnkey) system(s).
- ☐ Buy hardware separately and use an integration contractor.
- ☐ Buy hardware separately and do integration in-house.
- ☐ Move the applications to outside sources such as:
- ☐ Other Agency Data Centers
  - ☐ Remote Computing Service (for instance, Teleprocessing Services Program)
  - ☐ Contractor-Owned Contractor-Operated Facilities

5. How would you rank the following systems integration vendor (contractor) characteristics with respect to performance for your agency?

- 1 - Definitely Not Important
- 2 - Somewhat Important
- 3 - Important
- 4 - Very Important
- 5 - Crucial

<u>CHARACTERISTIC</u>	<u>RANK</u>				
1) Application Experience	1	2	3	4	5
2) Integration Experience	1	2	3	4	5
3) Staff Experience	1	2	3	4	5
4) Hardware Offered	1	2	3	4	5
5) Software Offered	1	2	3	4	5
6) Support	1	2	3	4	5
7) Federal Contract Experience .	1	2	3	4	5
8) Agency Experience	1	2	3	4	5
9) Price	1	2	3	4	5
10) Location	1	2	3	4	5
11) Other - _____	1	2	3	4	5

6. What level of satisfaction, on a scale of 1 to 5, have you or your agency experienced with system integration vendors in the past regarding:

<u>CHARACTERISTICS</u>	<u>RATINGS</u>				
a. Quality of Work	1	2	3	4	5
b. Quantity of Work	1	2	3	4	5
c. Responsiveness to Agency Needs	1	2	3	4	5
d. Project Management	1	2	3	4	5
e. Development Visibility	1	2	3	4	5
f. Delivery Schedule(s)	1	2	3	4	5
g. Cost	1	2	3	4	5

7. What would you like to see vendors do in the next 2-5 years to make their services more valuable?

8. Which type of vendor or organization appears more desirable for performing systems integration?:

☐ Mainframe Manufacturer

☐ Systems House (non-hardware)

☐ Not-For-Profit

Why?

9. What type of contract does your agency prefer for systems integration?

☐ Cost Plus                      ☐ Fixed Price                      ☐ Mix of Both

10. How does your agency view the OMB-A109 Major System Acquisition Guidelines (DD5000.1/5000.2 for DOD)?

☐ Useful                      ☐ Effective                      ☐ No Opinion

☐ Unnecessarily Lengthy                      ☐ Unnecessarily Expensive

☐ Other (what?) \_\_\_\_\_

11. What would be the controlling criteria in selection of a systems integration contractor?

☐ Proposed Technical Solution

☐ Risk Containment Procedures

☐ Contract Type

☐ Initial Cost

☐ Life Cycle Cost

☐ Other - \_\_\_\_\_

☐ Don't Know

12. Could you identify those factors (non-technical) that would have the greatest impact on your agency's computer systems plans?

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13. What technological changes might alter the way your agency accomplishes information processing?

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CONFIDENTIAL (INDUSTRY)

INPUT QUESTIONNAIRE

CATALOG NO: \_\_\_\_\_

STUDY TITLE: Systems Integration Report

STUDY CODE: \_\_\_\_\_

TYPE OF INTERVIEW: ☐ TECHNICAL ☐ TELEPHONE

DATE: \_\_\_\_\_

☐ MARKETING ☐ ON-SITE

☐ EXECUTIVE ☐ MAIL

INTERVIEWER: \_\_\_\_\_

COMPANY: \_\_\_\_\_

DEPARTMENT: \_\_\_\_\_

COMPANY TYPE: \_\_\_\_\_

FUNCTION: \_\_\_\_\_

MAIL CODE: \_\_\_\_\_

EXECUTIVE: \_\_\_\_\_

FUNCTION OF INTERVIEWEE: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

NAME	TITLE	TELEPHONE NO.
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\_\_\_\_\_

\_\_\_\_\_

SUMMARY

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

REFERENCES

\_\_\_\_\_

\_\_\_\_\_

Good morning/afternoon, my name is \_\_\_\_\_, and I am calling you on behalf of INPUT, an information systems and services research firm.

We are conducting a survey of Systems Integration trends in the federal government marketplace. The purpose of our study is to assist U.S. industrial clients in planning to satisfy future federal government needs for computer-based information systems and services.

I would like to ask you a few questions regarding your company's experience and views about federal Systems Integration opportunities over the next five years, if you have the time now.

In return for participating in this study, we will send you a free summary of the research results for your information. Your answers will be held in the strictest of confidence with the results of your interview being placed in statistical database. No personal or company name will be associated with your answers.

If it is convenient, I'd like to ask you those questions now.

1. (If not convenient) When would be a more convenient time?

\_\_\_\_\_ (date) . \_\_\_\_\_ (time)

2. (If uncooperative) Could you give me the name and phone number of someone who might be able to help us? \_\_\_\_\_ (name)

\_\_\_\_\_ (title) \_\_\_\_\_ (phone)

3. (If yes) Call time: \_\_\_\_\_

3a. Name of company: \_\_\_\_\_

Department or function: \_\_\_\_\_

3b. Interviewee: \_\_\_\_\_

Title: \_\_\_\_\_

(IF YES-CONTINUE)



1. Are you now or have you been a systems integration contractor?

[ ] NOW [ ] HAVE BEEN

2. Do you plan to remain or enter the federal systems integration market?

[ ] YES [ ] NO

3. What factors influenced your decision(to remain or leave the market).

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4. Which agencies do you have systems integration contracts with?

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5. What was your company's gross revenue last year?

6. What part of your revenue was done with the Federal Government last year?

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7. What part of your Federal revenue was done in systems integration work last year? \_\_\_\_\_

8. Have you recently been awarded any Systems Integration contracts whose revenues are not included in these figures? [ ] YES [ ] NO

8a. If YES,

AGENCY/PROGRAM

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9. In your opinion,  
Which agencies provide the most attractive systems integration opportunities?

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9a. Why? 

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10. In your opinion,  
Which agencies appear to be less attractive for systems integration contracts?

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10a. Why? 

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11. Do you believe that the Federal Systems Integration market will increase or decrease over the next 2-5 years?

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11a. Why? 

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12. The Government has several alternatives available for changing or adding to its data processing resources. Which of the following do you believe is likely to be most significant?

- ☐ Buying integrated (turnkey) system(s).
- ☐ Buying hardware separately and use an integration contractor.
- ☐ Buting hardware separately and doing integration in-house.
- ☐ Moving the applications to outside sources such as:
  - ☐ Federal Data Centers
  - ☐ Remote Computing Services (for instance, Teleprocessing Services Program)
  - ☐ Contractor-Owned Contractor-Operated Facilities.

13. How would you rank the following characteristics with respect to Systems Integration contractors?

- 1 - Definitely Not Important
- 2 - Somewhat Important
- 3 - Important
- 4 - Very Important
- 5 - Crucial

<u>CHARACTERISTIC</u>	<u>RANK</u>				
1) Application Experience	1	2	3	4	5
2) Integration Experience	1	2	3	4	5
3) Staff Experience	1	2	3	4	5
4) Hardware Offered	1	2	3	4	5
5) Software Offered	1	2	3	4	5
6) Support	1	2	3	4	5
7) Federal Contract Experience	1	2	3	4	5
8) Agency Experience	1	2	3	4	5
9) Price	1	2	3	4	5
10) Location	1	2	3	4	5
11) Other	1	2	3	4	5

14. On a scale of 1 to 5, where 5 means extremely satisfied, what have your federal clients experienced with system integration vendors in the past regarding:

<u>CHARACTERISTICS</u>	<u>RATINGS</u>				
a. Quality of Work	1	2	3	4	5
b. Quantity of Work	1	2	3	4	5
c. Responsiveness to Agency Needs	1	2	3	4	5
d. Project Management	1	2	3	4	5
e. Development Visibility	1	2	3	4	5
f. Delivery Schedule(s)	1	2	3	4	5
g. Cost	1	2	3	4	5

15. What do you believe the industry needs to do in the next 2-5 years to make its services more valuable to the government?

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16. Which type of contractor appears more desirable to federal agencies for performing systems integration:

☐ Mainframe Manufacturer    ☐ Systems House(non-hardware)    ☐ Not-for- Profit

16a. Why? 

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17. What type of contract does your company prefer for systems integration?

☐ Cost Plus Find Fee    ☐ Fixed Price    ☐ Mix of Both

17a. If a mix of contract types, how would you prefer to split the work?

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18. How does your Company view the OMB-A109 Major System Acquisition Guidelines (DD5000.1/5000.2 for DOD)?

☐ Useful                      ☐ Effective                      ☐ No Opinion  
☐ Unnecessarily Lengthy    ☐ Unnecessarily Expensive  
☐ Other (what?)

19. Rank the following criteria in order of significance in the Government's selection of a system integration contractor.

☐ Proposed Technical Solution  
☐ Risk Containment Procedures  
☐ Contract Type  
☐ Initial Cost  
☐ Life Cycle Cost  
☐ Other -  
☐ Don't Know

20. Could you identify those non-technical factors that would have the greatest impact on federal government systems integration.

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21. What technological changes might alter the way federal agencies accomplish their information processing?

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Thank you very much for your time.







